

THREE YEARS TO DESIGN A DOOR

Hotel service doors are entrance doors to rooms as well as depositories for clothing, shoes, or laundry, which require service. For example, if a guest has a suit to be cleaned, he simply opens the inner door, hangs the garment within the compartment, locks the door, and phones the valet service. A valet can then remove the suit from the compartment through the outer door without disturbing the guest. When returning the suit, the valet actuates a "service" indicator visible to the guest in the room, who may then remove the suit at his convenience.

In November, 1961, executives of Hilton Hotels met with Mr. Marron Kendrick, President of Schlage Lock Co., to discuss locks for the new Hilton to be built in San Francisco. In the course of this discussion, the Hilton executives mentioned their need for an improved service door.

Service or wardrobe doors are used in

many hotels as a convenience to guests wishing valet service. Their basic structure consists of a frame* with inner (room-side) and outer (hallway-side) doors as shown in Exhibit A-1.

*To avoid possible confusion, note that "frame" refers to the service door structure, not a door jamb.

The hotel service door market had been monopolized for nearly thirty years by a brand called Servidor. Its design had remained unchanged through the years and was no longer favored by hotel architects for three reasons. It was expensive to install inasmuch as it was supplied in knocked-down condition and had to be assembled on the job by high cost labor. Secondly, the storage capacity of the Servidor was too limited, and thirdly, its appearance was considered objectionable by modern architectural standards. Its bulging convex outer door protruded into the long clean-cut hotel corridors which are now so much in vogue.

Mr. Kendrick was confident that Schlage Lock Co. could develop the improved service door sought by the Hilton Hotel executives, even though the company had theretofore always restricted its activities to the design and manufacture of residential and commercial door locks. The company was founded in 1920 with a working capital of thirty dollars and had four employees when it began operations in a San Francisco loft. The success of their first product, the revolutionary push button cylindrical door lock invented by Walter Schlage, resulted in an output of 20,000 locks a month by 1925. Today Schlage Lock Co. turns out that many in a day and is the world's largest producer of door locks, employing 1,700 people in a modern plant in San Francisco.*

Soon after the Hilton Hotel meeting, Mr. Kendrick informed Schlage's Research Division of the new service door project and suggested several ways in which

existing service doors could be improved. Research Project File RP 6201 was established, and Mr. Hollis DeVines was designated Project Engineer for the new door design. Mr. DeVines had attended the University of Nebraska and majored in aeronautical engineering. His first job was with Willhelms in Connecticut, developers of audio-visual equipment. During World War II, he served in the Army Air Corps' Gunnery Division and afterwards joined an air conditioning firm in Houston. Subsequently, he worked for ten years as a Schlage Lock Co. salesman in the Southern states. Mr. DeVines then transferred to the Research Division at the main plant in San Francisco where he worked for five years, devoting part of this time to the design of the service door. Presently he is with the Marketing Division of Schlage Lock Co.

After a day's work on the new project, Mr. DeVines presented sketches of two possible service door designs to Mr. Kendrick, who approved one for further work. Mr. DeVines then spent several months developing the design and preparing detail drawings of the first model. The design process necessarily emphasized human factors engineering. For example, Mr. DeVines had to investigate all the possible varieties and sizes of clothing which the door could reasonably be expected to contain.

While the design work proceeded, a patent search was conducted which revealed that a variety of service doors had been invented since 1879. An early model is shown in Exhibit A-2a. Not all of the patents uncovered by the search pertained to wardrobe doors. Several dealt with multicompartment doors for apartments. These facilitated the delivery and collection of milk, bread, groceries, and parcels; and the danger of losing the articles by theft was reduced by furnishing each tradesman

*The pronunciation of "Schlage" has been Americanized to rhyme with "vague." For a more complete history and description of Schlage locks, see ECL 114, "Development of a Circular Strike Plate at Schlage Lock Company."

with a key to his particular compartment. See Exhibit A-2b. The patent search, costing \$27.00, was valuable in confirming the fact that all previous patents had issued prior to 1945 and were, as a consequence, in the public domain. Although Mr. DeVines utilized very little of the earlier construction, even had he done so, there would have been no danger of patent infringement.

The outer compartment door of the first model was designed such that its exterior surface was coplanar with the hallway wall, thereby resembling the modern flush panel door. See Exhibit A-3. The inner compartment door extended into the room for about 2½ inches and, unlike the Servidor, covered the entire doorway. See Exhibits A-4 and A-5. The first model thus provided considerably more storage capacity than the Servidor simply because its compartment encompassed almost the entire doorway. Both compartment doors were to be fabricated of steel sheet with reinforcing ribs. In addition, the compartment was equipped with a laundry basket and a shelf with a coat hanger rack mounted on its bottom, as shown in Exhibit A-4. The outer compartment door was secured by a lock with a rotatable locking blade which engaged with a metal strike plate attached to the frame as shown in Exhibit A-6.

The inner compartment door was secured by a pair of bolts which engaged with strike plates attached to the frame at its top and bottom, as shown in Exhibit A-7. The bolting action was controlled through linkages attached to a turn handle mounted on the inner door.

To prevent any embarrassment which might result from both inner and outer compartment doors being open at the same time, the first model utilized an interlock. This consisted of a latch mounted to pivot

on the frame such that when a guest opened the inner door, a spring would force the latch to slip behind a metal rim attached to the outer compartment door. See Exhibit A-7. Closing and bolting the inner door would force the latch to resume its original position, once again allowing the outer door to be opened independently of the inner door.

The frame was secured by a standard Schlage heavy duty cylindrical lock which caused a latch bolt to engage with a box strike in the door jamb.

Recessed door knobs were centered within circular cutouts in both compartment doors. Two metal dishes were also attached to the frame so as to surround the door knobs and to extend out to meet the cut-outs with a gasket seal when the compartment doors were closed. Sleeve guards were used to isolate locking mechanisms, hinges, etc., from clothing within the compartment.

The first model also had a "red and white" indicator to signal the return of clothing, shoes, etc. When a valet pushed a small lever, the red portion of a slide appeared in a window aperture on the inner door. When the guest opened the inner door, the white portion was automatically reset.

It is interesting to note that this door was completely reversible; that is, it could be used in both right-hand and left-hand doorways simply by inverting the door and interchanging the positions of the shelf and laundry basket. In addition, the door could be delivered to the job site fully assembled and installed in the standard fireproof door jambs specified for the San Francisco Hilton. Although it would weigh about 200 lbs., it could be easily opened and closed; in fact, its sturdy construction would argue well for its security and strength.

In the Spring of 1962, with the design of the first model complete, Mr. DeVines faced the problem of producing a prototype for display purposes. Schlage Lock Co. did not have the facilities for producing the large sheet metal parts the door would need; consequently, Mr. DeVines faced the additional task of arranging for a sheet metal fabricating company to manufacture the door. Mr. DeVines remembered that he had recently visited the W. R. Ames Co. (Ames) of Milpitas, California to view metal lacquer coatings. During this visit, he had also noted their use of press brakes in the manufacture of library shelving. Mr. DeVines felt that such sheet metal experience would qualify and interest them in the service door project. They agreed, particularly since they were seeking additional work for their shop at the time. In fact, Ames was willing to contribute their engineering time, labor, and materials to the production of a prototype (in the hope that a future source of business would develop between them and Schlage Lock Co.). Schlage Lock Co. would supply the locks latches, and other small parts for the prototype.

Throughout May, 1962, Mr. Robert Fox, a product engineer at Ames, prepared shop drawings for prototype parts, co-operating closely with Mr. DeVines. The prototype was fabricated with existing low production tooling and delivered to the Research Division in June, 1962.

Shortly thereafter, representatives from Hilton Hotels and from the office of Mr. William Tabler, architect for the San Francisco Hilton, viewed the prototype and, according to Mr. DeVines, were quite impressed. In fact, the Hilton Hotel representatives wanted to purchase the door for use throughout the entire hotel, but since this product was new and

untested, Schlage Lock Co. felt it would be wise to install the doors only on the top two floors of the hotel. These floors were chosen to allow as much time as possible for the modifications which must inevitably be made on a new product. Mr. DeVines also knew that the most luxurious suites would be located on these floors.

On November 13, 1962, Cahill Bros., Inc., main contractors for the San Francisco Hilton, and Schlage Lock Co. agreed that 210 doors (at a price of \$147.03 each) would be delivered to the hotel by March 1, 1964.

In the latter part of 1962, the Research Division received the architect's detailed requirements for service doors to be used in the new hotel. These requirements defined the scope of work, installation of doors, finishes, etc. In addition, the Research Division learned that the door would have to pass a 1½ hrs.-(B) fire test* (or an equivalent, such as ASTM E152-58) to satisfy San Francisco Building Department safety codes. The 1½ hrs.-(B) classification of this test (as described in the Appendix) might seem inappropriate for a guest room door; however, the design of the proposed San Francisco Hilton featured interior "drive-up" ramps leading to parking areas adjacent to the guest rooms on the first ten floors. See Exhibit A-8. Apparently the fire hazard presented by the proximity of automobiles to rooms justified the classification. Even though the Schlage service doors would be located on the 17th and 18th floors only, they still had to pass the 1½ hrs.-(B) fire test (or an equivalent) specified for the "parking area" floors, where Servidors would be used.

*See Appendix for a brief description of the fire test.

Since the first model prototype had been built primarily for display purposes, Mr. DeVines immediately began the design of a second model which would conform with the architectural requirements and specifications and hopefully be able to pass the necessary fire test.

While Mr. DeVines was steadfastly working on the second model, the Advertising Dept. of Schlage Lock Co. was trying to create a suitable commercial name for the door. Possibilities had included: Defen-dor, Stor-a-dor, Twin-dor, Accom-a-dor, Valdor, Dorval, and Valet-dor. Near the end of 1962 the choice had been narrowed to the last three, but no final decision had been made.

Early in 1963 a prototype of the second model was completed. This was similar to the first model except that the bolting mechanism had been replaced by cable-actuated latching mechanisms. To open the inner door, a guest would simply move a finger bar sideways. This was attached to a slide which pulled cables leading to catch clips in the latching mechanisms, one of which is shown in Exhibit A-9. The cable pull would force the catch clips, each mounted on a section of the inner door, to rotate against return springs and disengage from strike plates attached to the frame. When a guest closed the inner door, it secured itself automatically, thus avoiding the possibility inherent in the first model that a guest might forget to bolt the inner door securely after closing it.

In addition, Mr. DeVines followed the architect's specifications by constructing the second model's compartment doors of double panels and sandwiching corrugated asbestos with reflective aluminum backing within the panels. This construction enhanced the fire and heat transmission resistance of the entire door.

Mr. DeVines' previous sheet metal experience in the air conditioning business certainly aided his design of the service door. Perhaps his experience with aircraft had even influenced his choice of cable-actuated mechanisms for the second model.

Other interesting details of this model are shown and described in Exhibit A-10.

On January 22, 1963, Mr. Tabler personally inspected the prototype of the second model and was generally quite pleased. He did, however, recommend that: 1.) the slide handle be replaced by a turn handle and located on a vertical line with the door knobs and 2.) an arresting device to be added to both compartment doors to prevent their opening beyond 90 degrees. A third model of the service door was designed to include the above recommendations, with the relocation of the handle allowing even greater storage capacity in the central area of the door. At this stage the design was "frozen," and on February 21, 1963 an order was sent to the W.R. Ames Co. to produce four doors for fire-testing purposes. Shortly thereafter, Mr. Marron Kendrick decided that henceforth the service door would be officially known as the Schlage Valet-Door.

In early April, 1963 Mr. DeVines contacted Underwriter's Labs, Inc. (U.L.) in Chicago, to arrange for fire-testing of the door in the hope of gaining their famous and respected label of approval. Before they could consider developing a test program, U.L. requested that they be sent detailed drawings of the door design, which Mr. DeVines did immediately.

While awaiting a reply from U.L., Mr. Kendrick and the Research Division carefully reviewed the door design and decided that even further modifications were necessary before it could be released

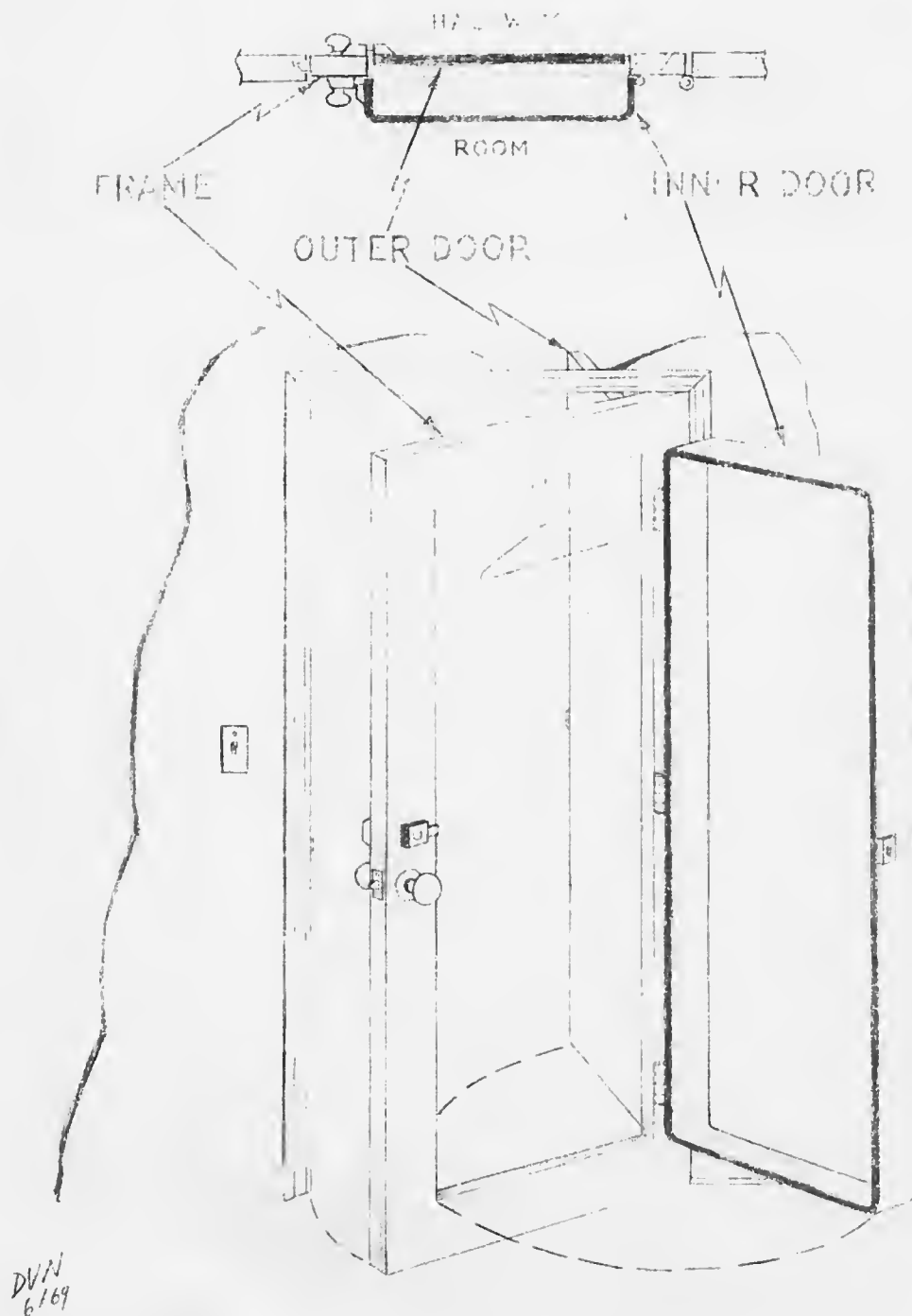
for full production, or even fire-tested. They were particularly concerned about the following problems:

1. The return springs in the inner door latching mechanism might lose their elasticity under the prolonged and severe heating of the fire test, allowing the inner door to swing open during the test.
2. The cables would stretch under repeated use and require occasional adjustment.
3. The interlock was not foolproof; a knife blade jammed between the outer door and frame could defeat it.
4. The compartment door hinges were unattractive.

Also at this time the Research Division of Schlage Lock Co. received an urgent appeal from the F. W. Woolworth Co. to develop an electric security system for locking their stores. Mr. DeVines, who had some previous experience with electrical circuits, was immediately reassigned to this new project.

Exhibits, Section A

- Exhibit A-1** View of a Service Door (not Schlage Model)
- Exhibit A-2a** Early Service Door Patent (no. 1,391,133)
- Exhibit A-2b** Early Multi-Compartment Door Patent (1,222,964)
- Exhibit A-3** Photograph, Exterior of Schlage Lock Co. Service Door (Model no. 1)
- Exhibit A-4** Photograph, Schlage Lock Co. Service Door Compartment from Inside the Room (later Model)
- Exhibit A-5** Photograph, View of a Servidor compartment from Inside the Room
- Exhibit A-6** Top View of a Section of Schlage Lock Co. Service Door (Model no. 1) Showing Outer Door Securing Mechanism
- Exhibit A-7** Side View of a Section of Schlage Door (Model no. 1) Showing Inner Door Securing Mechanism
- Exhibit A-8** San Francisco Hilton Hotel Views
- Exhibit A-9** Side View of a Section of Schlage Service Door (Model no. 2) Showing Inner Door Latching Mechanism
- Exhibit A-10** De Vines Patent no. 3,208,562



Note: Both compartment doors are shown in an open position for illustrative purposes only. In actual use, the compartment doors would never be open simultaneously, and the entire service door would never be opened with either compartment door open.

The compartment boundaries are the interior surfaces of the frame and compartment doors (when closed).

Exhibit A-1 View of a Service Door (not Schlage Model)

F. J. MATCHETTE.

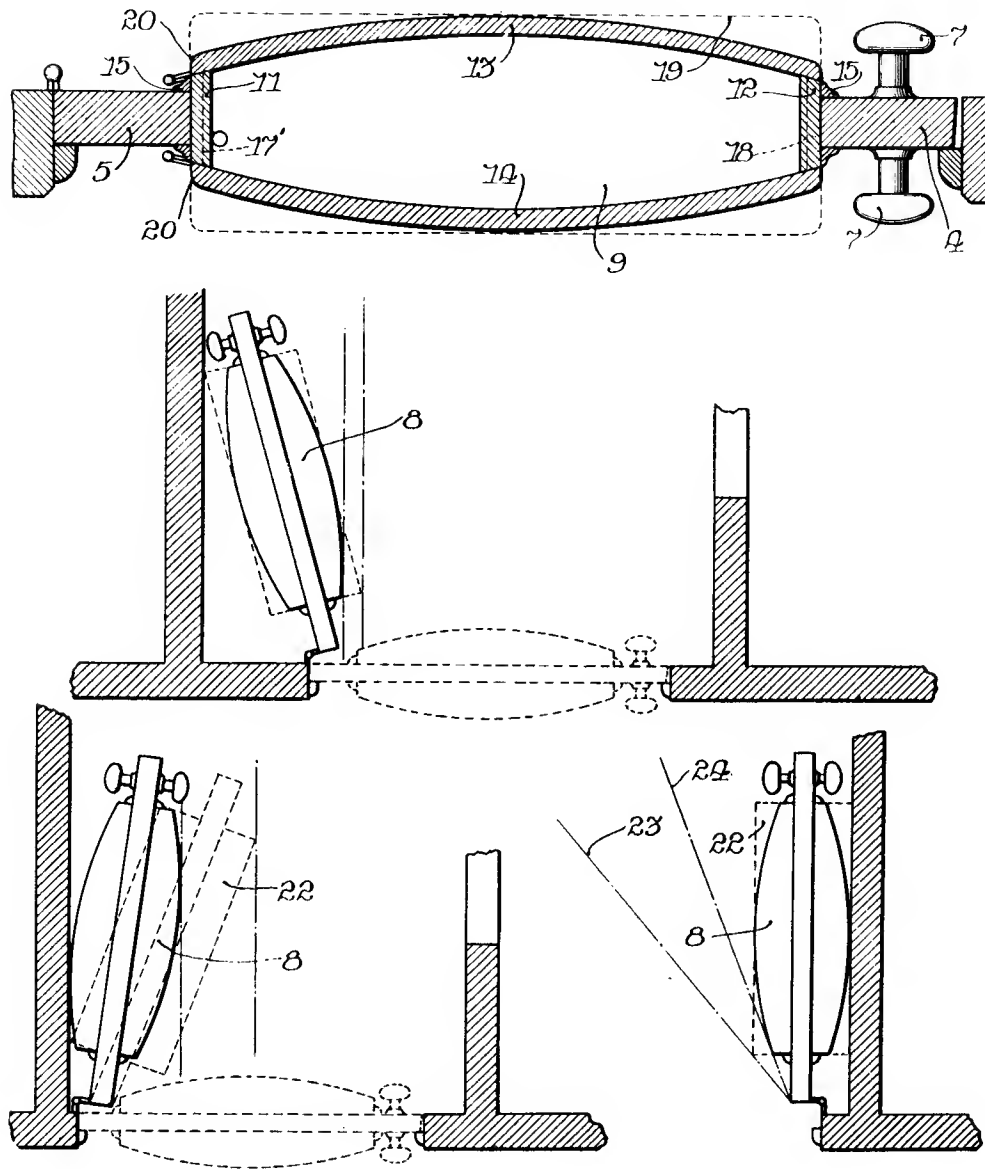
DOOR.

APPLICATION FILED SEPT. 8, 1917.

Patented Sept. 20, 1921.

2 SHEETS SHEET 2.

1,391,133.

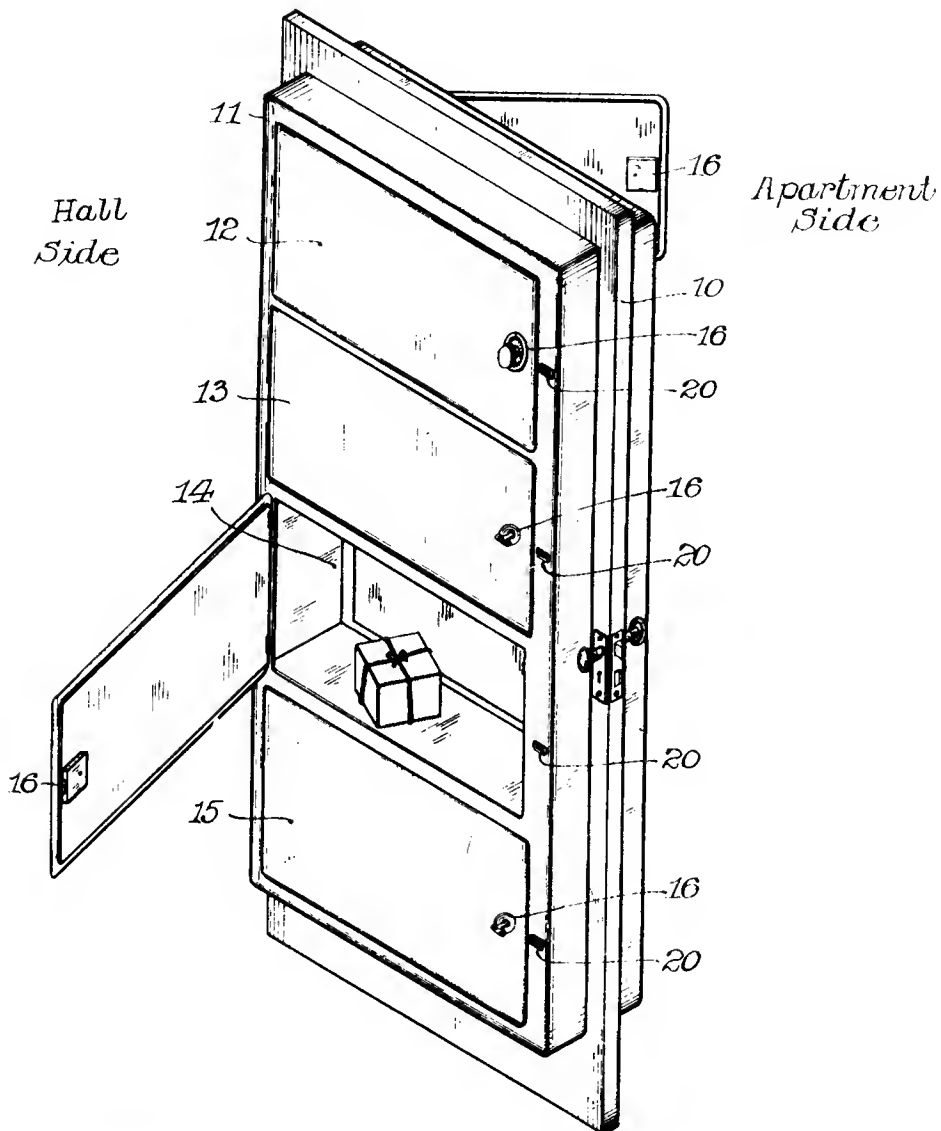


Inventor
 Frank J. Matchette
 By Brown, Hanson, & Butcher
 Attorneys

F. J. MATCHETTE.
CABINET SERVICE DOOR.
APPLICATION FILED JULY 23, 1914.

1,222,964.

Patented Apr. 17, 1917.
2 SHEETS—SHEET 1.



WITNESSES

Edmund A. Price
John A. Diener

INVENTOR

Frank J. Matchette
By Brown, Hanson & Porttche,
Attys



Exhibit A-3 Photograph, Exterior of Schlage Lock Co. Service Door (Model no. 1)



Exhibit A-4 Photograph, Schlage Lock Co. Service Door Compartment from Inside
The Room (later Model)



Exhibit A-5 Photograph, View of a Servitor Compartment from Inside the Room

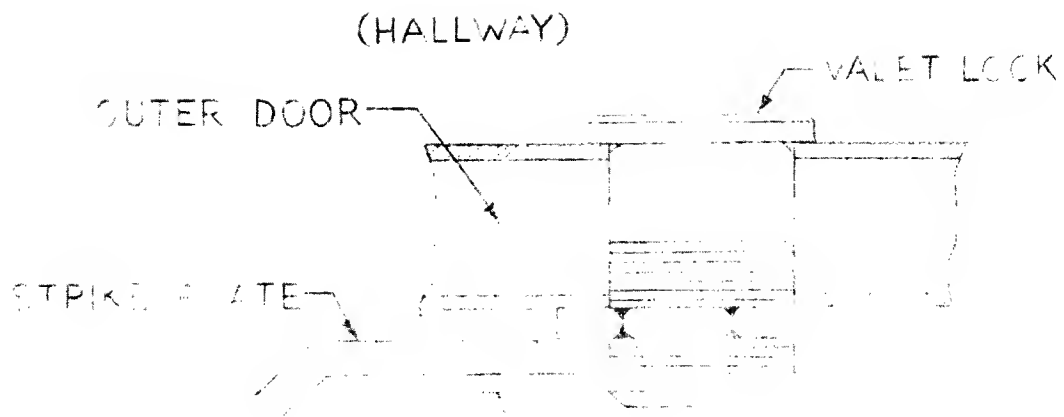


Exhibit A-6 Top View of a Section of Schlage Lock Co. Service Door (Model no. 1) Showing Outer Door Security Mechanism

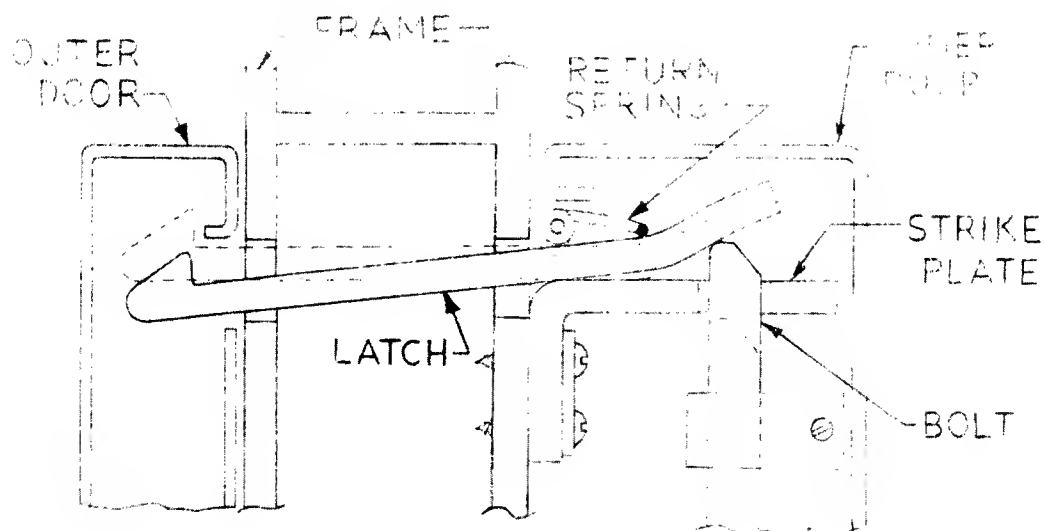


Exhibit A-7 Side View of a Section of Schlage Door (Model no. 1) Showing Inner Door Security Mechanism

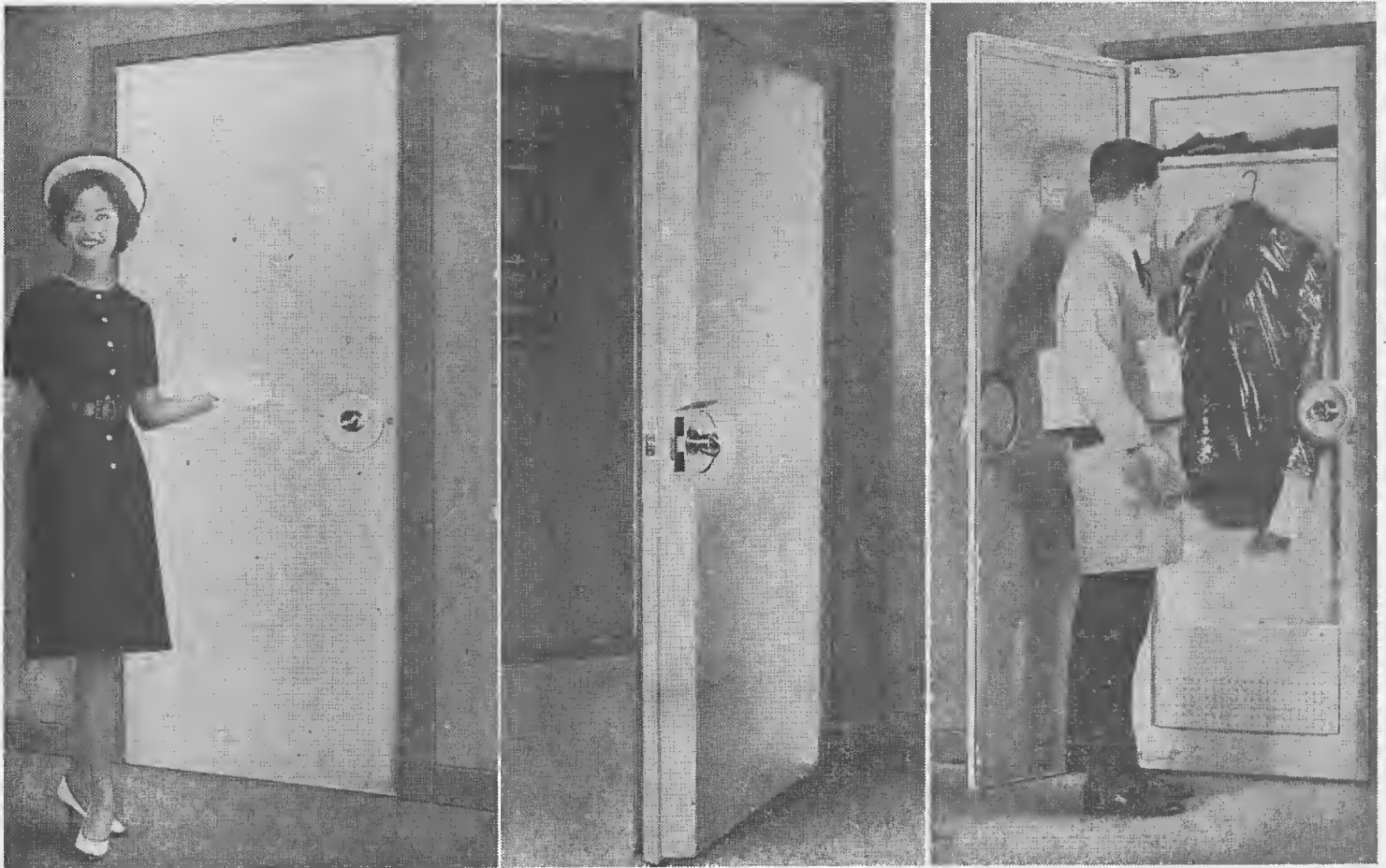


Exhibit A-8 San Francisco Hilton Hotel Views

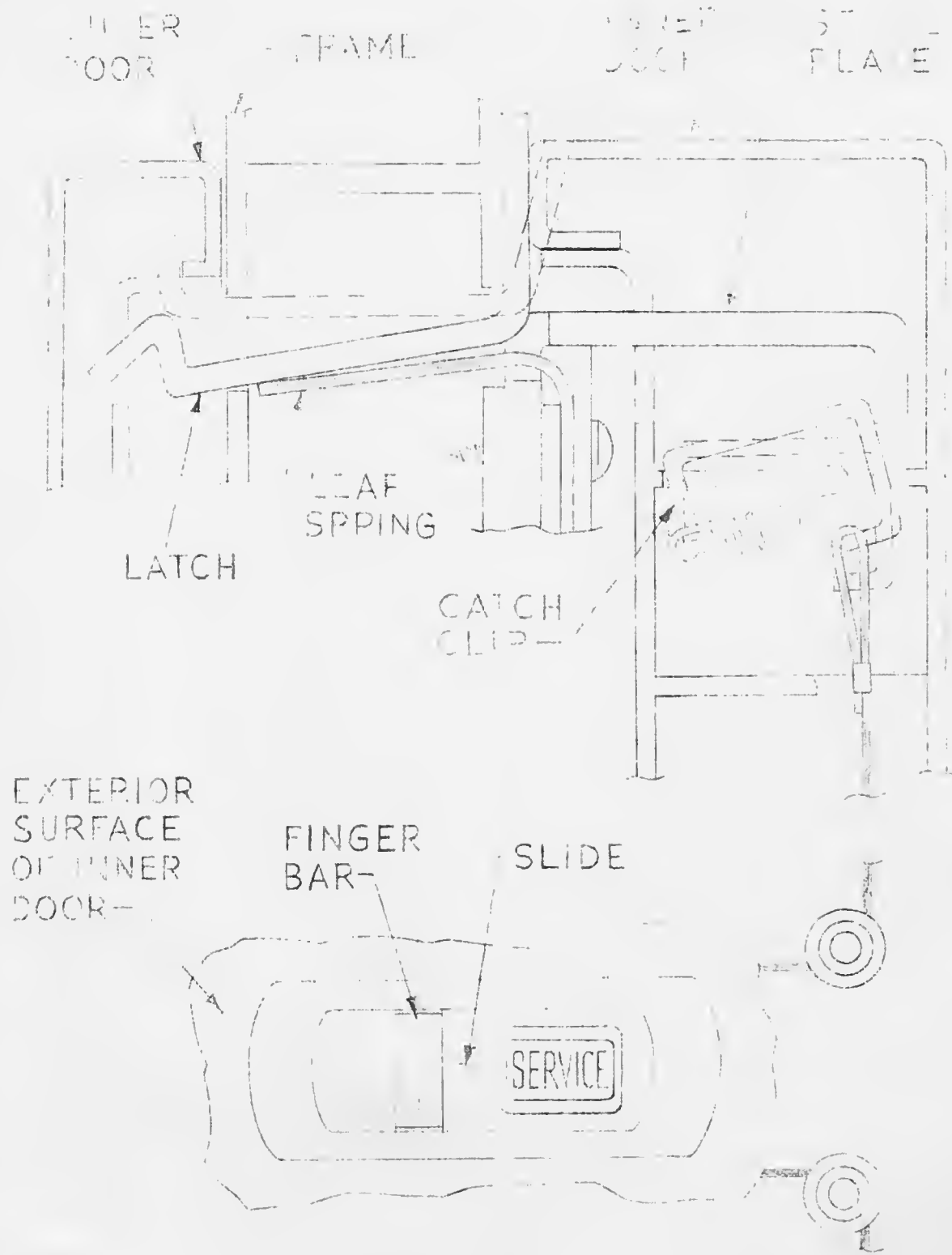


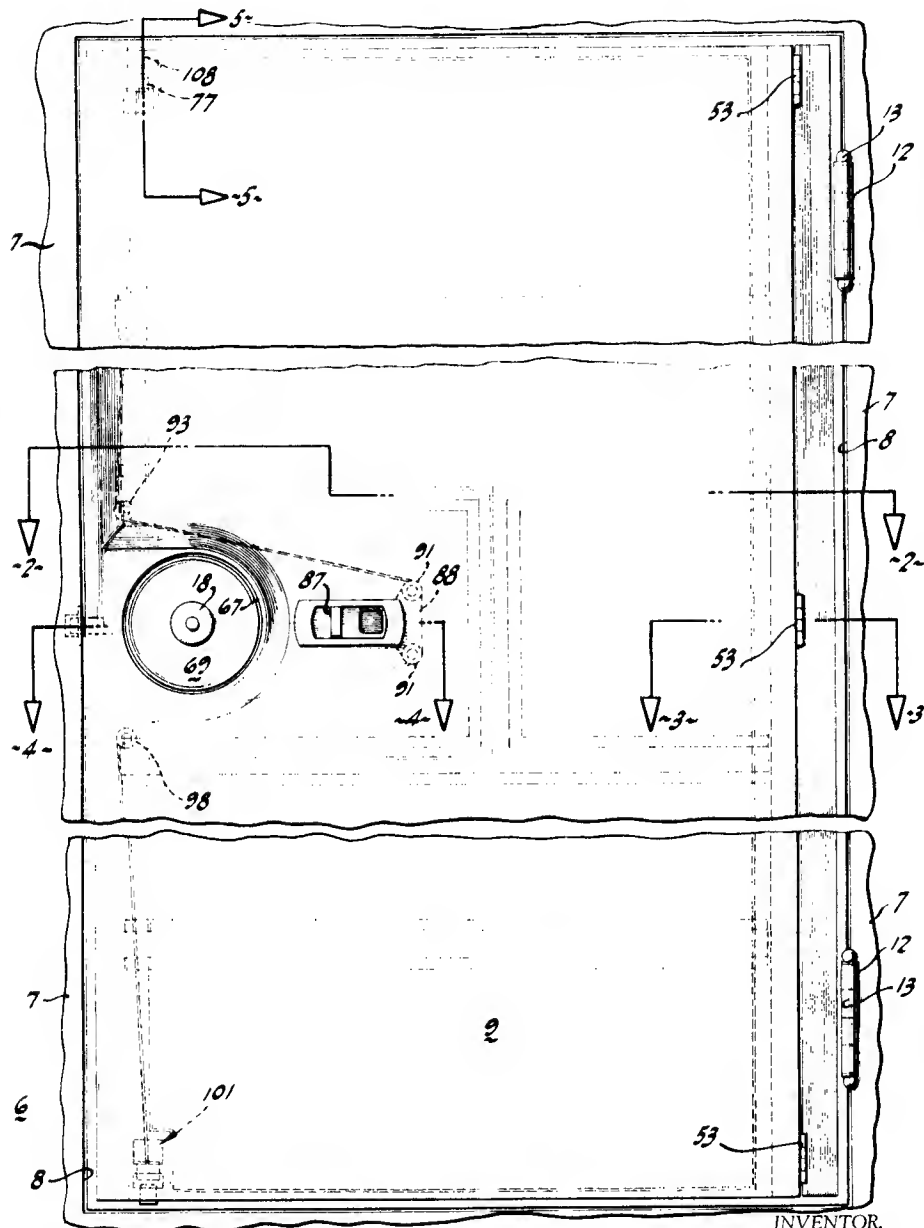
Exhibit A-9 Side View of a Section of Schlage Service Door (Model no. 2) Showing Inner Door Latching Mechanism

Sept. 28, 1965

H. L. DE VINES
SERVICE DOOR

3,208,562

Filed Jan. 9, 1963



INVENTOR.
HOLLIS L. DEVINES
BY *Lothrop & West*
ATTORNEYS

Exhibit A-10 De Vines Patent no. 3,208,562

Sept. 28, 1965

H. L. DE VINES
SERVICE DOOR

3,208,562

Filed Jan. 9, 1963

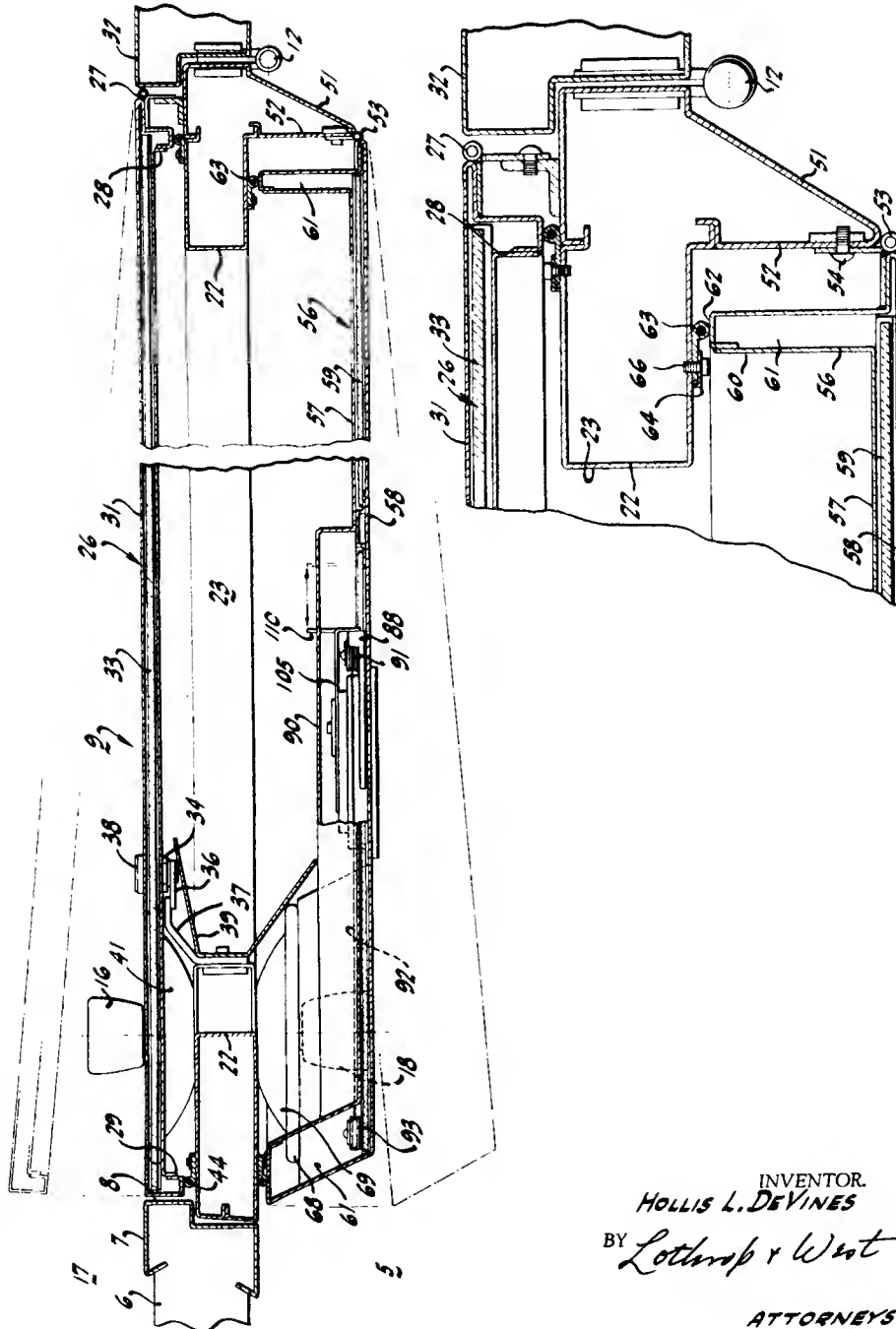


Exhibit A-10 Continued

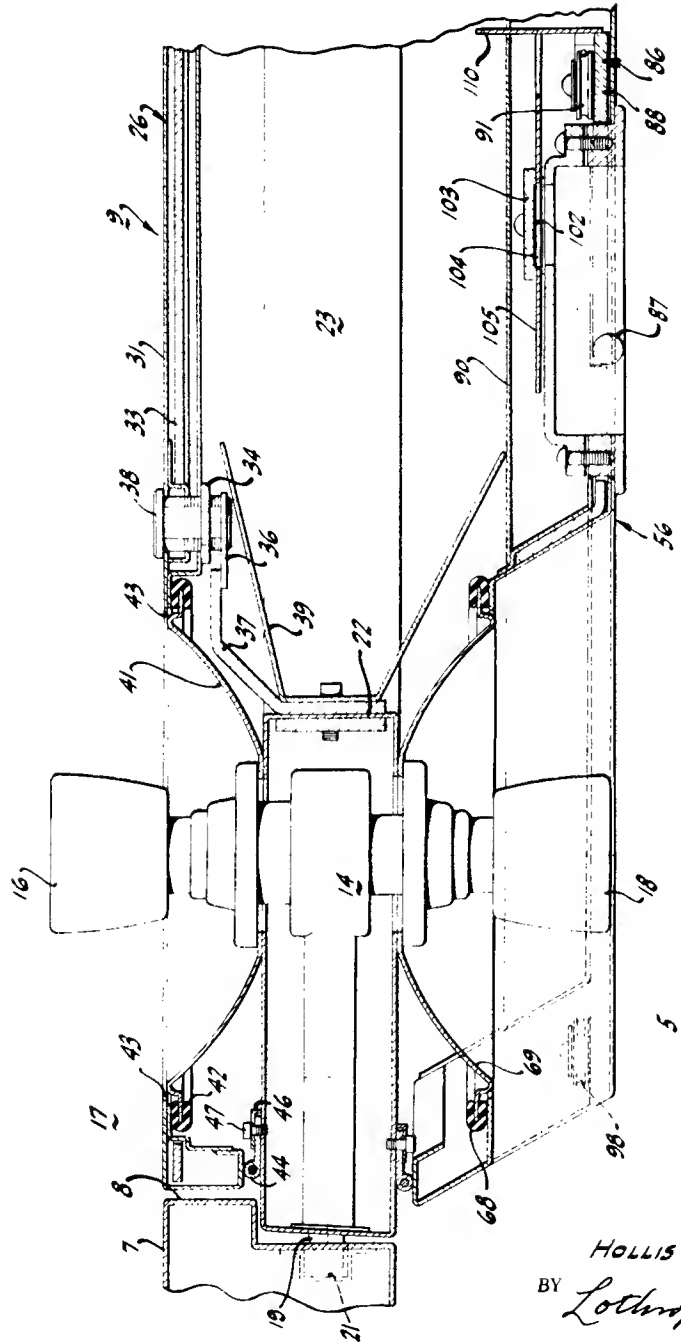
Sept. 28, 1965

H. L. DE VINES

3,208,562

SERVICE DOOR

Filed Jan. 9, 1963



INVENTOR.
 HOLLIS L. DEVINES
 BY *Lothrop + West*
 ATTORNEYS

Exhibit A-10 Continued

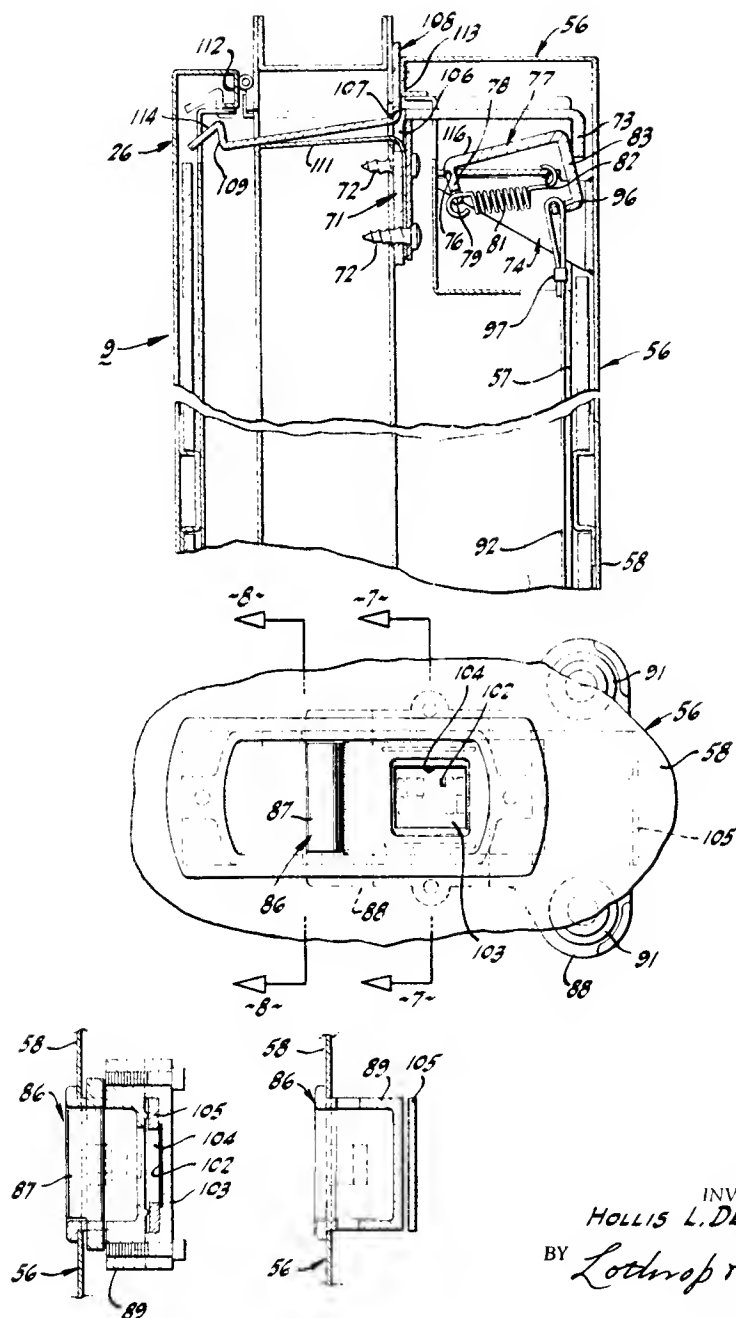
Sept. 28, 1965

H. L. DE VINES

3,208,562

SERVICE DOOR

Filed Jan. 9 1963



INVENTOR
 HOLLIS L. DEVINES
 BY *Lothrop & Went*
 ATTORNEYS

Exhibit A-10 Continued

United States Patent Office

3,208,562

Patented Sept. 28, 1965

1

3,208,562

SERVICE DOOR

Hollis L. De Vines, San Francisco, Calif., assignor to
Schlage Lock Company
Filed Jan. 9, 1963, Ser. No. 250,391
7 Claims. (Cl. 189—46)

My invention relates to doors for closing doorways, particularly in hotels, motels and places of similar type, the service door having the capacity not only to control ingress to and egress from the room to which it is pertinent, but also having an interior capacity to receive clothing, shoes, packages, and the like, which are to be temporarily stored for service. An arrangement of this general sort is shown in patent 1,686,831, for example.

While there have heretofore been available service doors incorporating a chamber for the temporary reception of materials to be passed back and forth between an access hallway, for example, and the interior of a room, they have been somewhat limited in capacity and have had other disadvantages under modern conditions of building construction and use which it is an object of the present invention to overcome.

Another object of the present invention is to provide a service door which can readily be installed in a class A fireproof building without in any way reducing or restricting the fireproof qualities of the structure.

Another object of the invention is to provide a service door having a substantially increased capacity over those heretofore available.

A still further object of the invention is to provide a service door which can be arranged to have a large capacity, yet which can be utilized in connection with doors employing standard hardware.

A further object of the invention is to provide a service door that does not transmit sound well.

A still further object of the invention is to provide a service door arranged so that unauthorized access to the room cannot be obtained.

A still further object of the invention is to provide a service door which is attractive in appearance, quiet in operation and generally is in keeping with high standards of modern building construction and equipment.

A still further object of the invention is to provide a service door which can readily be fabricated and installed and one which requires little or no maintenance or mechanical attention.

Other objects together with the foregoing are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawings, in which:

FIGURE 1 is a front elevation from the interior of a room showing the service door of the invention;

FIGURE 2 is a cross section (portions being broken away), the plane of section being indicated by the lines 2—2 of FIGURE 1;

FIGURE 3 is an enlarged detail showing in cross section the construction of the portion of the service door near the hinges, the plane of section being indicated by the lines 3—3 of FIGURE 1;

FIGURE 4 is an enlarged detail showing the construction of the service door near the knob, the view being in cross section, the plane of which is indicated by the lines 4—4 of FIGURE 1;

2

FIGURE 5 is a cross section in enlarged detail, the plane of which is indicated by the lines 5—5 of FIGURE 1;

FIGURE 6 is a detail in elevation showing a portion of the inner latch actuating mechanism;

FIGURE 7 is a detail in cross section, the plane of which is indicated by the lines 7—7 of FIG. 6; and

FIGURE 8 is a detail in cross section, the plane of which is indicated by the lines 8—8 of FIGURE 6.

The service door according to the invention can be incorporated in a number of different ways, but has been successfully constructed and operated substantially as shown herein. In this instance the door is situated to control the doorway of a room 5 having a wall 6 in which is installed a door frame 7 to leave an opening 8 to be closed or controlled by a door panel 9. The panel is generally rectangular in elevation and is associated with the frame 7 by means of butts or hinges 12 in the customary way so that the panel 9 swings with respect to the frame 7 into the room about the axis 13 of the hinges.

The door panel is likewise related to the frame 7 in that the door is provided with one portion 14 of a lock unit of standard construction including an outer knob 16 projecting into a hallway 17 adjacent the room 5 and also having a knob 18 projecting inwardly into the room 5. Also included in the lock unit is a reciprocable latch bolt 19 adapted to be received in a strike box 21 forming the other portion of the lock unit and mounted in the frame 7. In the customary way, rotation of the knob 16 or the knob 18 when the lock unit is unlocked withdraws the latch bolt 19 and releases the interengagement of the door panel 9 and the frame 7.

Particularly in accordance with this invention, the door panel 9 includes a marginal panel frame 22 made up of suitable structural members so as to define the outer margins of the door panel and likewise so as to define a central opening 23. This also is of rectangular configuration and is sufficiently extensive as to occupy substantially the entire area of the door panel except for the members of the panel frame.

On the exterior or hall side of the panel frame is disposed means for forming an outer housing 26. This conveniently is fabricated of sheet metal formed into the appropriate configurations to provide strength and rigidity and is mounted to swing on and relative to the door panel 9 by means of appropriate hinges 27 having their axis parallel to the axis 13 of the hinges 12. The outer housing 26 has inturned portions 28 and 29 so as to encompass a substantial volume, but preferably is mounted so that its exterior surface 31 is approximately coplanar with the outer surface 32 of the hall wall. Thus the presence of the service door does not particularly encroach upon or interfere with the hall space.

Incorporated in the construction of the outer housing is a fire retardant or resistant panel 33, for example, of asbestos or glass fiber, which is closely confined not only to serve as thermal insulation, but likewise to serve as a sound insulator and as a sound dampener relative to the sheet metal of the outer housing. Sounds are not easily transmitted through the service door and the opening or closing of the outer housing does not transmit any unusual or unpleasant sounds.

The outer housing swings between a closed position as shown in the solid lines in FIGURE 2 and an open position

3,208,562

2

tion approximately at right angles thereto. An intermediate position is illustrated by the broken lines in FIGURE 2. The outer housing is retained in its closed position by means of a securing device 34 having a detent 36 movable into and out of a position engaging a projecting finger 37 forming part of the panel frame 22. The securing device is controlled by a lock mechanism 38 and is protected by a shield 39. When the securing structure is in the FIGURE 2 position, the outer housing cannot be swung independently of the door panel, but when the lock mechanism 38 is appropriately actuated by a suitable key to rotate the detent 36 out of engagement with the finger 37, the outer housing can be swung as indicated.

Since the outer housing is substantially or very nearly of the same area or extent as the door panel itself, it is provided with a special construction in order to accommodate the outer knob 16. The lock set including the knob 16 as part of its mounting on the door panel frame is provided with a concave dish 41 suitably held permanently in place and around its free-standing periphery provided with a cushion 42, for example, of rubber. Correspondingly, the outer housing is formed with a cutout 43 preferably of circular configuration so that the outer housing when closed will abut against the cushion 42 on the dish 41. Since the material 42 is somewhat yielding and since the material of the dish 41 may also yield slightly, it is a simple matter to lock the outer housing in position with a tight engagement between the outer housing and the dish 41. By this means the knob 16 is made readily accessible and ordinary standard hardware can be utilized with an outer housing of large capacity.

Since it is desired to have a tight relationship when the parts are closed, the door panel frame is likewise provided near its edges with a packing strip 44 conveniently of rubber-like material, reinforced if desired, and held in position by overlying clip strips 46 and fasteners 47. In this way a tight interengagement is provided to prevent drafts and sound transmission.

In a somewhat similar fashion, the panel frame 22 adjacent the hinges 12 is provided with a special configuration including an inclined outstanding portion 51 affording a reentrant face 52 against which hinges 53 can be held by fastenings 54. The hinges 53 have their axes parallel to the axis 13 and serve to support an inner housing 56. This likewise is constructed of a number of sheet metal elements given appropriate configuration for strength and rigidity and is also formed with an inner wall 57 and an outer wall 58 between which a sheet 59 of asbestos or comparable heat and sound insulating material is disposed. The inner housing 56 is contoured to provide considerable depth or volume and has a peripheral margin 60 extending entirely around the housing and defining an enclosed chamber 61. The margin 60 ends in a surface 62 designed to abut against a packing strip 63 when the inner housing is closed. The packing strip is held in place by a clip strip 64 and fastenings 66.

Adjacent the lock set 14 the inner housing is provided with a cutout 67 of generally circular configuration designed to abut, when the inner housing is closed, with a peripheral gasket 68 mounted on an inner dish 69 held in position by the lock set 14. In a fashion previously described, the inner housing when closed forms a tight seal against the dish 69, thus making the standard knob 18 readily accessible, yet affording a large capacity within the inner housing and affording a tight seal against the transmission of air currents or sound.

In order that the inner housing 56 can be held in closed position at the option of the occupant of the room 5, there is provided an appropriate latch mechanism. Since the latch mechanism is duplicated at the upper and lower portions of the structure, a description of one of the latch devices applies equally to the other. Fixed on the panel frame near the edge thereof is a bracket 71 secured by

4

fastenings 72 and having a downturned lip 73. Appropriately fastened on the inner housing 56 is a bracket 74 having a notch 76 near its extremity. Resting and pivoting in the notch 76 is an inclined latch clip 77 having a downturned end 78 passing through the notch and also having an aperture 79 into which is fitted one end of a coil spring 81, the other end of which fits through an opening 82 in the bracket 74 so that the latch clip 77 is normally biased upwardly. In the upwardly biased position of the clip 77 an inner leg 83 of the clip lodges behind and rests against the downturned portion 73 of the bracket 71, thus preventing any swinging movement of the inner housing relative to the door panel.

In order that the latch so formed may be released readily by a room occupant, the interior wall 57 of the inner housing is provided with a sliding actuator 86. This actuator includes a finger bar 87 projecting outwardly from a slide 88 confined by an appropriate frame 89 situated for the most part within a guard housing 90. The slide 88 at one end carries a pair of cable pulleys 91 over which is trained a light cable 92. One portion of the cable is led over a fixed pulley 93 to travel through the inaccessible chamber 61 and at its end is looped through an opening 96 in the latch clip 77 and is secured by a collar 97. Similarly, the other portion of the cable 92 is led over a pulley 98 and is similarly fastened to the bottom latch 101. Consequently, when the room occupant moves the finger bar 87 to translate the slide 88, he likewise displaces the pulleys 91. The cable 92 is thus appropriately tensioned and rocks each latch clip 77 about its fulcrum on the bracket 74, thus tensioning the spring and simultaneously lowering the latch leg 93 below the lower terminus of the bracket lip 73, so that the inner housing can be opened. When urged shut, the inner housing automatically latches. The slide 88 can be fitted with sufficient friction so as to require manual return or can move quite freely so as to be returned automatically by the springs 81 as soon as manually released. The entire slide actuator 86 is protected by the guard housing 90, which is open only to the chamber 61.

The particular position of the actuator 86 and consequently of the latch mechanism 77 is preferably indicated by the provision of an indicium 102 on a plate 103 in a position so that it can be covered and uncovered and so obscured or observed through an opening 104 in an auxiliary slide 105 partly in the path of the slide 88. The auxiliary slide is displaced to cover the indicium 102 when the slide 88 is moved in one direction and remains in that position until manually returned by displacement of a finger 110 projecting through a slot in the guard housing 90. This indication is of importance since there is provided an arrangement for precluding the opening of the outer housing unless the inner housing is in its closed position.

As particularly shown in FIGURE 5, the bracket 71 is formed with a recess 106 in which rests the knee 107 of a T-bar 108. The upper portion of this bar is wide enough to rest on the bracket 71 at either side of the recess 106, but the extended portion of the T-bar terminates in a latch configuration 109. The bar 108 is pressed to move the latch portion 109 upwardly by a leaf spring 111 secured by the same fastenings 72 that hold the bracket 71 in place.

When in uppermost position the latch portion 109 lies against and restrains an inturned flange 112 forming part of the construction of the outer housing. When the inner housing is closed, however, a similar inturned portion 113 thereon abuts and rotates the bar 108 so that the latch portion 109 is depressed against the urgency of the spring 111 and out of the path of the flange 112. Under these circumstances, the outer housing, being unlatched, can be swung open as soon as the key mechanism 38 is properly operated. When the inner housing is in its open position or is even slightly open, the bar 108 is free or released and the leaf spring 111 is effective to drive the latch 109 into an uppermost position interlocking with the inturned portion 112 and thus restraining the outer housing. When the outer housing is in open position, it can always be

3,208,562

5

swing shut. Either the latch portion 109 is already depressed, or, if the latch portion happens to be in its uppermost position, then the turned flange 112 cams against a latch ramp 114 and flexes the latch bar, which is sufficiently springy to admit of this operation. In a somewhat similar fashion, when the inner housing is to be closed, it is immaterial whether or not the cord 92 is tensioned and the latch clip 77 is lowered since in any case when the inner housing is swung toward closed position the inclined central portion 116 of the latch clip 77 rides under the downturned lip 73 and then if unrestrained springs upwardly behind the lip 73 to complete the latching operation.

With the device as described installed in the fashion indicated, the occupant of the room, for example, without in any way disturbing the normal locking facilities provided by the mechanism 14, can at his leisure operate the finger bar 87 to swing open the inner housing and then to place clothing, shoes or other items in the compartment formed not only by the hollow portions of the outer housing and the inner housing, but also by the opening 23 in the door panel. So long as the inner housing is open and the room occupant is able to communicate with the storage compartment, it is impossible for anyone even by actuating the lock 38 to gain access to the compartment or to the room from the exterior. However, as soon as the inner housing has been brought to closed position, the latch 109 is released and anyone with the appropriate key may open the outer housing and retrieve the materials left therein or deposit other materials.

The provision of the service door, particularly because of the cutouts provided, does not in any wise interfere with the installation on the door panel of the usual, normal hardware. The service door can thus be used interchangeably with or as a replacement for standard doors in other portions of the same building.

What is claimed is:

1. A service door comprising a door frame, a door panel including a marginal panel frame enclosing an opening, means mounting said panel frame to swing on said door frame about a vertical axis adjacent one vertical edge of said panel frame, a lock set member mounted on said door frame, an interfitting lock set member mounted on said panel frame adjacent the opposite vertical edge thereof and projecting therefrom on the inner side and on the outer side, a rigid outer dish mounted on said panel frame and having a free-standing periphery surrounding said projecting lock portion on the outer side, a rigid inner dish mounted on said panel frame and having a free-standing periphery surrounding said projecting lock portion on the inner side, an outer housing adapted to overlie and cover said opening and to extend over the outer surface of said panel frame, means mounting said outer housing on said panel frame to swing about a vertical axis remote from said lock set members, means holding said outer panel against swinging on said panel frame, means in said outer housing defining a cut-out having the margin thereof engaging said free-standing periphery of said outer dish when said outer housing covers said opening and said outer surface of said panel frame, an inner housing adapted to overlie and cover said opening and to extend over the inner surface of said panel frame, means mounting said inner housing on said panel frame to swing about a vertical axis remote from said lock set members, means in said inner housing defining a cut-out having a margin thereof engaging said free-standing periphery of said inner dish when said inner housing covers said opening and said inner surface of said panel frame, and means holding said inner housing against swinging on said panel frame.

2. A service door comprising a door frame, a door panel including a marginal panel frame enclosing an opening, means mounting said door panel to swing on said door frame about a first vertical axis adjacent one vertical edge of said panel frame, outer means overlying and

6

covering the outside of said opening and said panel frame, inner means including a cut-out overlying and covering the inside of said opening and said panel frame, means mounting said inner means to swing on said panel frame about a second vertical axis adjacent said first vertical axis, a lock interengaging said door panel and said door frame and having one member mounted on said panel frame remote from said axes and having a part projecting through said cut-out when said inner means covers said opening and said panel frame, and a rigid dish surrounding said projecting part of said lock and having a free-standing periphery in position to engage the margin of said cut-out when said inner means covers said opening and said panel frame.

3. A service door comprising a door frame, a door panel including a marginal panel frame enclosing an opening, means mounting said door panel to swing on said door frame about an axis adjacent one edge thereof, a housing adapted to overlie and cover said opening and said panel frame, means mounting said housing to swing on said panel frame about an axis adjacent said edge and into and out of a position closing said opening and overlying said panel frame, a lock mounted on said panel frame in a position remote from said edge and having a portion projecting from said panel frame, means on said housing defining a cut-out adapted to accommodate the projecting portion of said lock when said housing is adjacent a position closing said opening and overlying said panel frame, and a rigid dish surrounding the projecting portion of said lock and having a portion directed away from said panel frame and in position to engage the margin of said cut-out when said housing is in said position.

4. A service door comprising a door panel including a marginal panel frame enclosing a generally rectangular opening, a door lock mounted on said panel frame, said door lock including an inner knob projecting from said panel frame on the inside of said door, a rigid dish on said panel frame projecting around said inner knob and providing an abutting portion extending toward the inside of said door, an inner housing of generally rectangular extent, means forming a cut-out in said inner housing, and means mounting said inner housing on said panel frame to swing about an axis remote from said door lock and out of and into a position overlying and covering said opening and said panel frame on the inside of said door with the edge of said cut-out engaging said abutting portion of said dish, said inner housing and said dish when in engagement preventing access to said inner knob through said rectangular opening.

5. A service door comprising a door panel including a marginal panel frame enclosing a generally rectangular opening, a door lock mounted on said panel frame, said door lock including a latch bolt extending through said panel frame, said door lock also including a knob operatively connected to said latch bolt and projecting from said panel frame, a rigid dish on said panel frame and projecting around said knob, said dish having a free-standing periphery, a housing of generally rectangular extent adapted to overlie and cover said opening and said panel frame, means forming a cut-out in said housing, the edge of said cut-out substantially engaging the periphery of said dish when said housing overlies and covers said opening and said panel frame, and means mounting said housing to swing on said panel frame about an axis remote from said door lock.

6. A service door as in claim 5 in which said dish periphery is provided with a resilient gasket.

7. A service door comprising a panel frame including a hinge side member and a lock side member spaced apart and defining the sides of an opening, a door lock mounted on said lock side member and having a knob projecting away from said lock side member, a rigid dish having an abutting portion, means mounting said dish on said lock side member around said knob with said abutting portion away from said lock side member, a housing adapted

3,208,562

7

to overlie and cover said opening and said lock side member, means hinging said housing on said hinge side member, and means defining a cut-out in said housing, said cut-out having an edge adapted to lie against said abutting portion when said housing overlies and covers said opening and said lock side member.

1,670,372 5/28 Matchette 20-16
 2,537,896 1/51 Hinton et al. 20-16 X
 FOREIGN PATENTS
 1,113,498 12/55 France.
 747,278 1/46 Germany.

References Cited by the Examiner**UNITED STATES PATENTS**

215,439 5/79 Crane ----- 20-16 X 10

HARRISON R. MOSELEY, *Primary Examiner.*

APPENDIX

Description of Fire Test

*According to the Underwriters' Laboratories, Inc. specifications, a 1½ hr.-(B) fire test consists of temperature exposing one surface of a door assembly mounted on a furnace chamber wall according to the time-temperature curve (shown on the next page) for a 1½ hr. period. The letter (B) refers to the classification of the doorway or opening, in this case designating "enclosures of vertical communication through buildings (stairs, elevators, etc.)." Immediately following its furnace exposure, the door is subjected to a water stream directed over its entire heated surface with a duration of 2½ minutes per 100 sq. ft. of

area. The stream is delivered by a 2½ inch hose discharging through a 1-1/8 inch orifice from a distance of 20 feet. The nozzle base pressure is 30 psig. A door assembly is considered to have passed the test if:

1. the door does not separate more than ½ inch at the latch location;
2. the edges do not move from their original positions by more than the thickness of the door during the first half of the fire test or more than 1½ times the thickness during the remainder of the test (including the water test); and
3. the door does not develop any openings as a result of the temperature exposure or the impact, erosive, and cooling effects of the water stream.

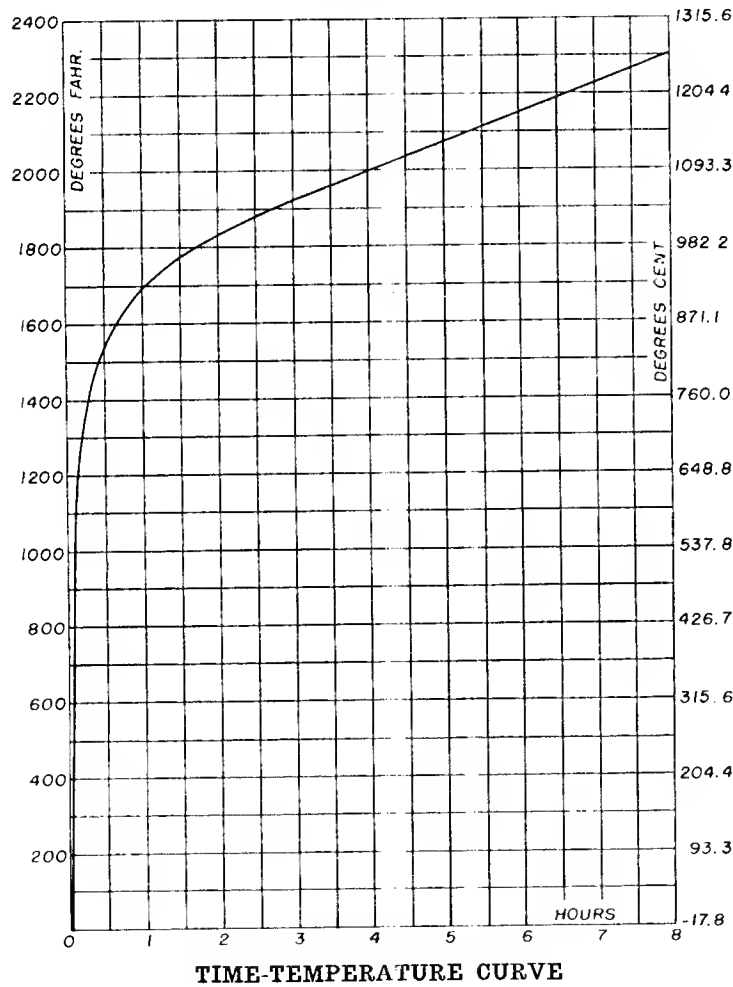
Control of Fire Tests

Time-Temperature Curve

4 The fire exposure of door assemblies shall be controlled to conform to the applicable portion of the standard time-temperature curve shown in Figure 1. The points on the curve that determine its character are:

1000 F (538 C).....	at 5 minutes
1300 F (704 C).....	at 10 minutes
1550 F (843 C).....	at 30 minutes
1700 F (927 C).....	at 1 hour
1850 F (1010 C).....	at 2 hours
2000 F (1093 C).....	at 4 hours
2300 F (1260 C).....	at 8 hours or over

FIGURE 1



THREE YEARS TO DESIGN A DOOR

Upon Mr. DeVines' reassignment to the Woolworth project, Mr. Ralph Neary, who had joined Schlage Lock Co. in May 1962 and had assisted Mr. DeVines on the design of the second and third Valet Door models, became supervisor of Research Design and immediately assumed responsibility for the Valet Door project. Mr. Neary graduated from the University of Santa Clara in 1954 with a B.S. degree in mechanical engineering. Before joining Schlage's Research Division he had worked for the Western Gear Corp. as a design engineer, product promotion engineer,

customer service supervisor, and sales administration supervisor with a two year leave of absence for military service.

Mr. Neary urgently began attacking the problems still existing in the third model, knowing that the Valet-Door needed a fire test soon; Ames was already preparing to fabricate third model prototypes; and the delivery date for the 210 doors was less than ten months away. After several weeks of intense work the problems of the third model were solved, and a fourth model emerged.

The inner door latching mechanism on the third model was discarded in favor of the following fail-safe device. A lift bar was placed within a section of the inner door as shown in Figure 4 of Exhibit B-3, the backset of the knobs having been increased from a standard five inches to six inches to allow this. The lift bar contained spring-mounted rollers at both ends, one of which is shown in Exhibit B-1. If the inner door was being closed, these rollers would contact and ride over conical strikes attached to the frame, and inevitably engage with the latching shoulders on the strikes. To open the inner door, a guest would simply lift a handle (attached to the lift bar through a slot in the inner door), and this, in turn, would free the rollers from the latching shoulders, permitting the inner door to be swung open. The entire inner door securing device was isolated from the compartment by an angle barrier, which also served as a fire stop. Note that even if the springs in the latching mechanism lost their elasticity during a fire, the inner door would remain securely latched to the frame. This new device also eliminated the cables and their problems.

The outer door lock used in all previous models was now modified so that its rotatable locking blade engaged with an inclined slot in a strike plate fastened to the frame. Vertical adjustment of the strike plate allowed the amount of wedging of the locking blade to be varied so that the tightness of the closed fit between the outer door and frame could be controlled. See Exhibit B-2.

The fourth model also incorporated a new interlocking device, impervious to tampering with a knife blade or similar implement. A rod was placed through two in-line holes in the frame as shown in

Exhibit B-3, Figure 9. If the inner door were opened, a spring attached to the interior of the outer door would force the headed end of the rod towards the inner door. See Exhibit B-3, Figure 9. This action caused a latch lever to pivot into the rotational path of the locking blade of the outer door securing device. Thus the locking blade could not be rotated nor the outer door opened while the inner door was open. Closing the inner door would force the rod inwardly and the latch lever out of the path of the locking blade, thereby allowing the outer door to be opened. In addition, this interlocking mechanism enhanced the security of the Valet Door by preventing a valet who had just finished servicing a compartment from inadvertently turning his key and removing it from the outer door lock unless the outer door had been closed and firmly secured.

Lastly, the compartment door piano hinges used on previous models were now semi-concealed, improving the appearance of the entire Valet Door. Other interesting details of this model are shown and described in Exhibit B-3.

In the latter part of June 1963, U.L., Chicago, finally answered Mr. DeVines' request for a fire test. Stating that they had carefully reviewed the design of the third model, U.L. requested clarification of several aspects of the design before they could begin to develop a plan for the test. They also suggested that the merits of the cable-spring latching mechanism of the third model be reviewed (which, unknown to them, had been done two months earlier). Mr. Neary then sent U.L. detailed drawings of the fourth model, emphasizing the urgent need for a fire test.

Fearing further delays in the

negotiations with U.L., Mr. Neary reserved fire door testing facilities at the Engineering Materials Laboratory of the University of California, Berkeley for late November, 1963. Meanwhile, the Research Division conducted their own preliminary fire test on July 25, 1963. This consisted of mounting simulated sections of the Valet Door over an opening to a large electric furnace and slowly raising the furnace temperature to 1800° F. The average outer door temperature remained below 600° F. throughout the test, and the prospects of the Valet Door passing a full-scale fire test were encouraging.

From telephone conversations with U.L. in August 1963, Mr. Neary ascertained that further delays were indeed occurring. The review of the door design was apparently entangled in committee work in Chicago. At this point Mr. Kendrick decided not to wait for the U.L. test and to proceed with the Berkeley fire test.

The Research Division, by virtue of a cancellation, was able to secure an earlier date for the fire test at Berkeley. On October 18, 1963, Professor G. E. Troxell, acting as an outside consultant, conducted an A.S.T.M. E152-58 fire test, which the Valet Door readily passed. Note Exhibits B-4, B-5, and B-6a, b. This test, which cost \$1,700, provided virtual assurance that the Valet Door would satisfy most, if not all, local fire codes encountered wherever it might be used in the future. The 210 door production run was successfully completed by March 1, 1964 but not without difficulties. For example, the fabrication of the Valet Door frame required that four sections be welded together in a precise rectangular shape. Since the welding tended to distort the frame, Mr. Neary and the W.R. Ames Co. had to devise a special

welding jig to overcome this difficulty. Also, to the surprise and dismay of Ames, the assembly and temporary storage of the Valet Doors occupied over half of their plant floor space, hindering the manufacture of their other products.

Meanwhile, the Research Division wrestled with the details of finding a durable paint for the door which would satisfy the architect's color specifications, of creating concise and readable guest instruction decals, etc. In addition they learned that the San Francisco Hilton, even before opening, had booked numerous conventions, one as far distant as 1995. The Valet Door was then tested to make sure that it would be able to withstand rough usage such as slamming, kicking, guests attempting to stand on the bottom of the frame, etc.

Prior to the installation of the doors in the Hilton, Mr. Neary convinced the hotel contractors to reinforce the 2" plaster corridor walls with the bracing scheme shown in Exhibit B-7; otherwise, the loads carried by the upper hinges would probably have caused the plaster to crack.

The delivery of the Valet Door proceeded on schedule. Each door required only about eight minutes of installation time as compared to the 30 to 40 minutes typically required for a Servidor.

In order to trademark the Valet Door, Schlage Lock Co. had to establish it in commerce with either another state, a foreign nation, or an Indian tribe. Choosing the most practical of the three alternatives, Mr. Ernest L. Schlage, Vice President of the company, and Mr. DeVines exhibited a Valet Door to architects and hotel people at their Reno, Nevada, dealer's

warehouse in late March, 1963, thus establishing it in interstate commerce. The United States Patent Office eventually registered trademark 791,574 on June 22, 1965. This trademark allowed Schlage Lock Co. the exclusive use of the "Valet Door" name for twenty years with the option to renew the trademark for equal periods thereafter.

Following the opening of the San Francisco Hilton, Schlage's Marketing Division ran a full page advertisement in the *San Francisco Examiner* on May 29, 1963, showing the use of the Valet Door in the new hotel. They also exhibited the door at several hardware manufacturers' shows in the East, where representatives of the Overly Mfg. Co. of Greensburg, Pa., a major producer of metal doors and other sheet metal products, saw it and expressed an interest in quoting on the manufacture of it. The W.R. Ames Co. had, in the meantime, declined further interest in the manufacture of the door, not having the space or tooling to handle the large production runs which might be needed. The Overly Mfg. Co. did, however, possess the massive sheet metal presses capable of forming the larger parts of the door in one operation. At their own expense, they built a prototype of the Valet Door, utilizing a honeycomb construction technique to reduce costs, and presented the prototype and a quotation to Schlage Lock Co. The estimated price per door in quantities of 500 was approximately \$172.00, while for quantities of 1,000 or more, \$145.00. Schlage Lock Co. had found a suitable manufacturer.

Schlage's Marketing Division chose not to actively promote sales until field reports on the Valet Door had been received. Towards the end of 1964, Mr.

DeVines interviewed valets and maintenance men at the San Francisco Hilton and found no complaints about the Valet Door, only considerable praise, particularly when compared to the Servidors being used in the hotel. Although they may have been losing potential gratuities for their services, the valets liked the Valet Doors. Despite their favorable reports, sales for the Valet Door did not develop. The Research Division briefly explored the use of the door in apartments, but nothing came of this either.

The Research Division had spent an estimated 5000 hours of engineering time on the project, had successfully delivered a superior product, and had a large manufacturer interested in producing the door. As of this writing, however, there have been no additional sales of the Valet Door beyond the San Francisco Hilton. Evidently the market for service doors has disappeared. A partial explanation for this would be the increasingly wide acceptance of "drip-dry" and "sta-prest" clothing, which may have reduced the market for valet service itself. It is doubtful, however, that this alone can provide a sufficient explanation, especially in view of the modern company expense account used by so many traveling businessmen. At this time, it is still unclear why the Valet Door "never sold" beyond the San Francisco Hilton, or whether it ever will sell. Perhaps the increased national interest in crime prevention and security may re-vitalize the hotel service door market.

List of Exhibits Part B

- Exhibit B-1** Inner Door Securing Mechanism (Model no. 4)
- Exhibit B-2** Outer Door Securing Device (Model no. 4)
- Exhibit B-3** Kendrick and Neary Patent no. 3,283,443
- Exhibit B-4** Views of Valet Door Mounted for Fire Test
- Exhibit B-5** Valet Door After Fire Test
- Exhibit B-6a** Furnace Temperature of Fire Test
- Exhibit B-6b** Temperature Rise of Unexposed Side of Valet Door During Fire Test
- Exhibit B-7** San Francisco Hilton Wall Bracing Scheme for Use on "Valet Door" Floors

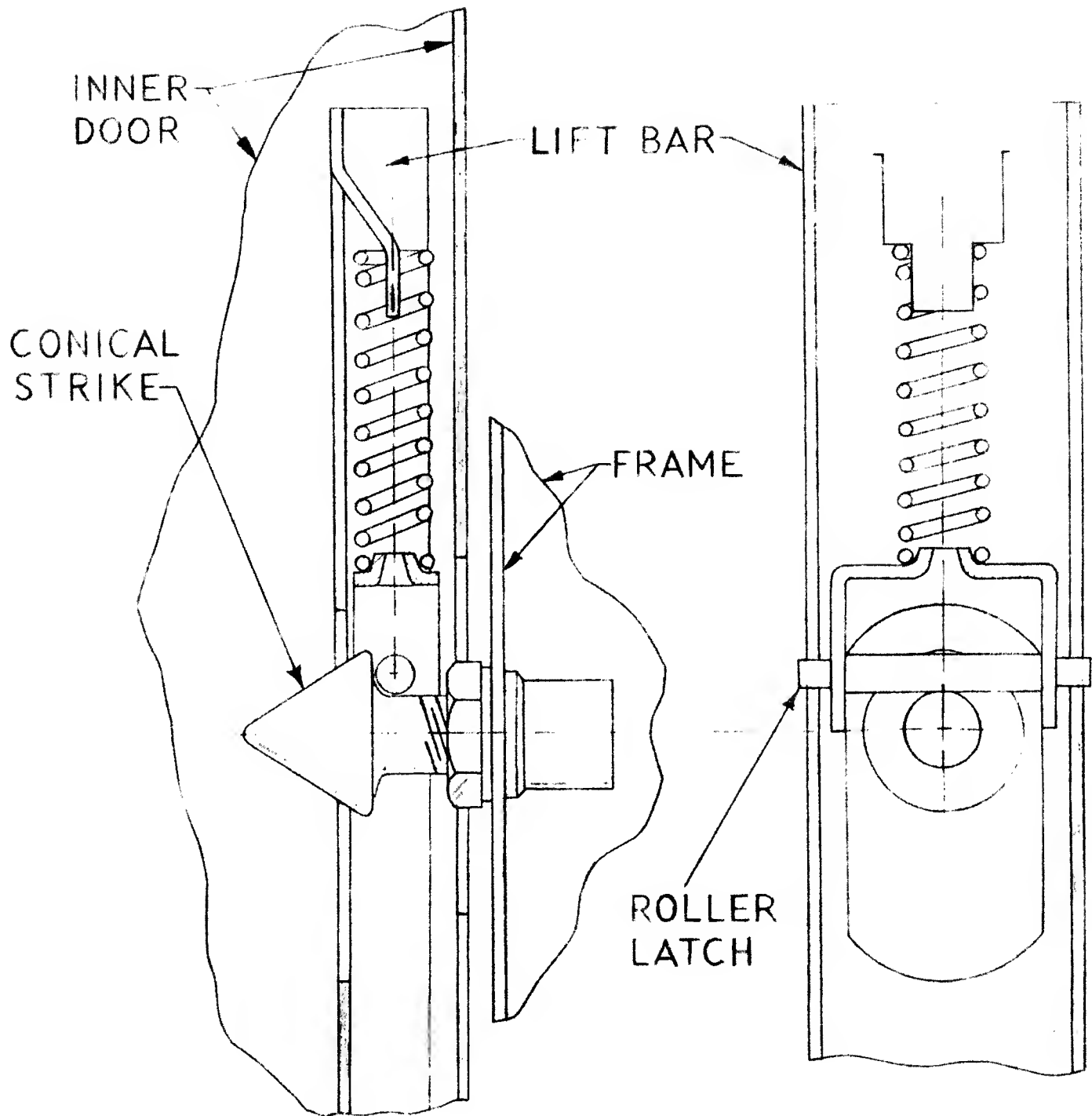


Exhibit B-1 Inner Door Securing Mechanism (Model no. 4)

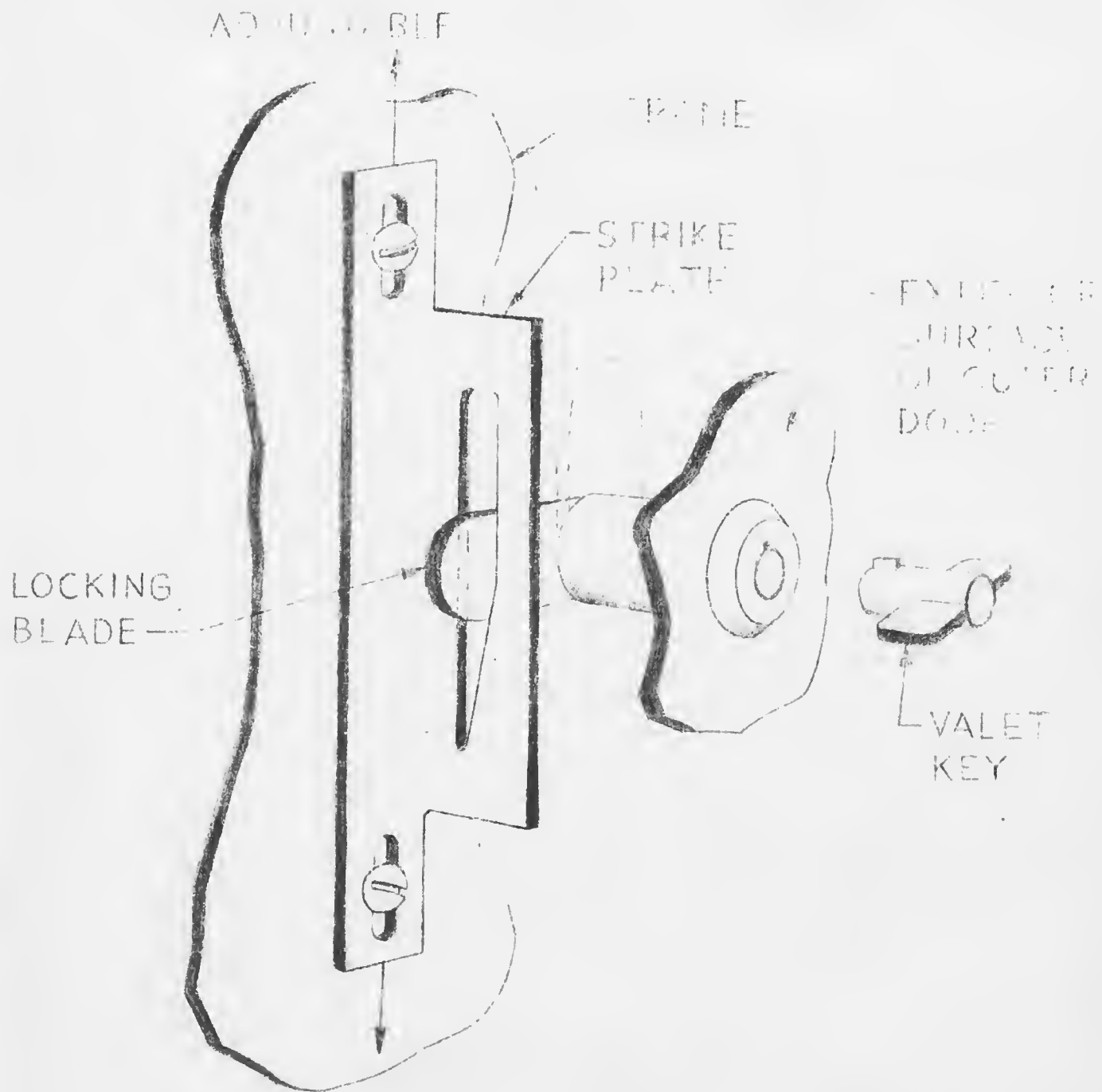


Exhibit B-2 Outer Door Securing Device (Model no. 4)

Nov. 8, 1966

M. KENDRICK ETAL

3,283,443

COMPARTMENTED DOOR

Filed May 14, 1964

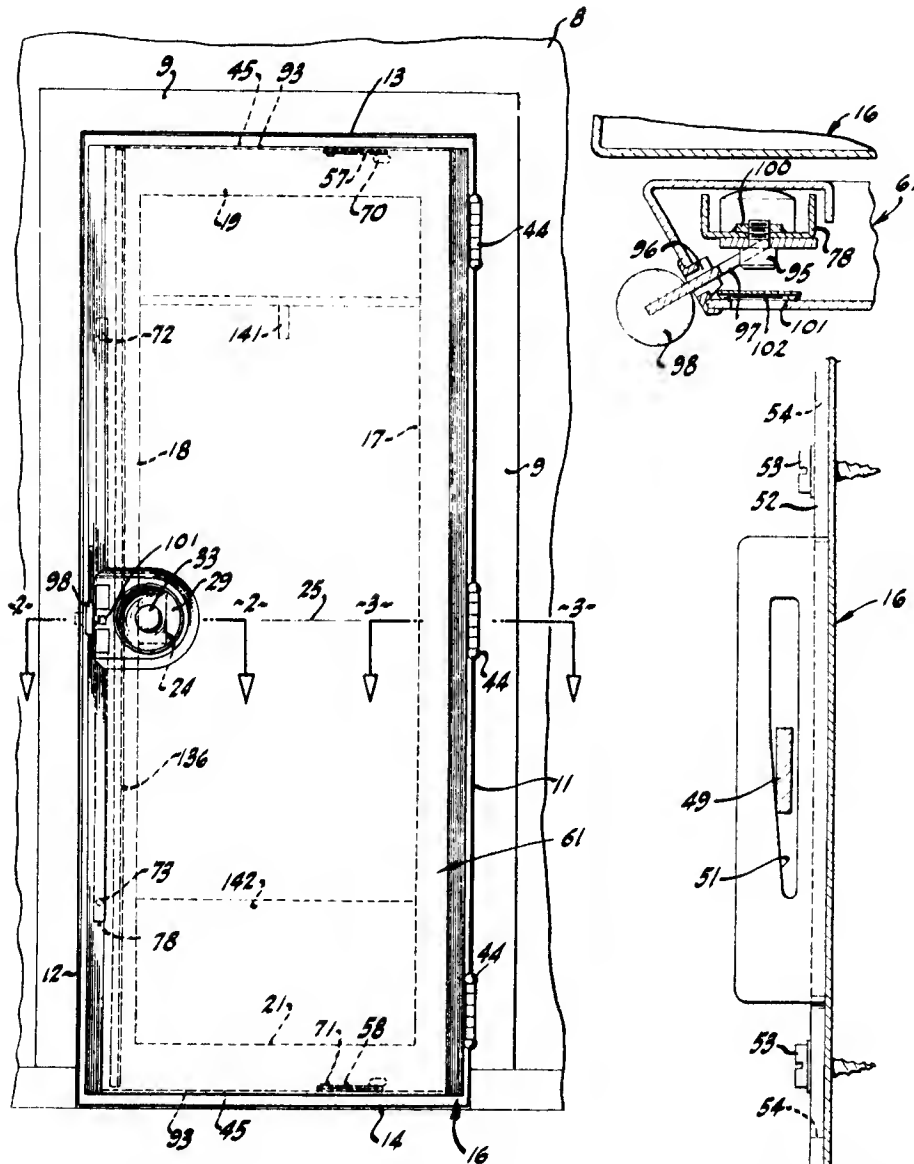


Exhibit B-3 Kendrick and Neary Patent no. 3,283,443

Nov. 8, 1966

M. KENDRICK ET AL
COMPARTMENTED DOOR

3,283,443

Filed May 14, 1964

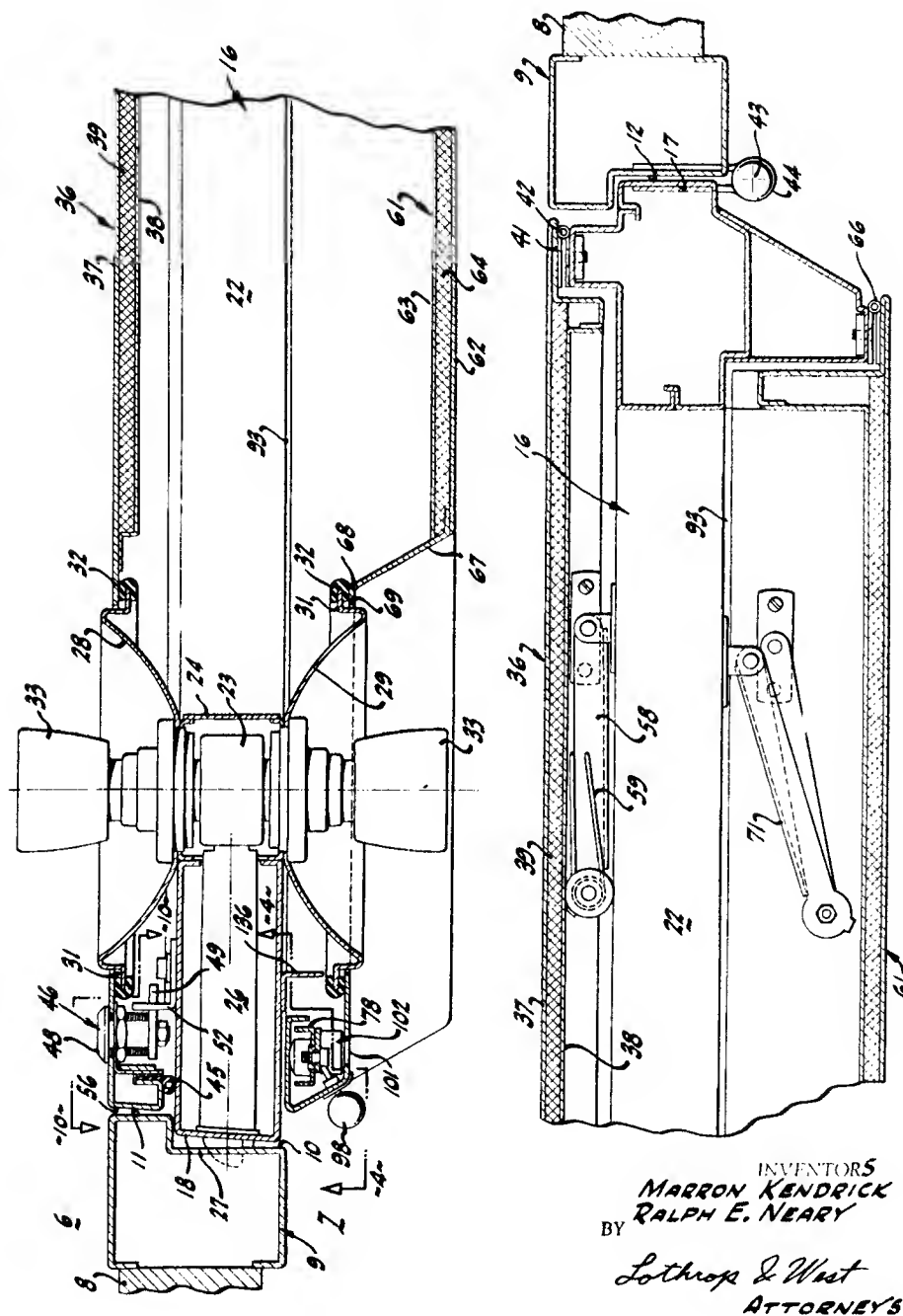


Exhibit B-3 Continued

United States Patent Office

3,283,443

Patented Nov. 8, 1966

1

3,283,443

COMPARTMENTED DOOR

Marron Kendrick, Atherton, and Ralph E. Neary, San Francisco, Calif., assignors to Schlage Lock Company, a corporation

Filed May 14, 1964, Ser. No. 367,481
5 Claims. (Cl. 49—62)

Our invention relates to doors particularly useful in hotels and like accommodations arranged so that the door may be utilized for ingress and egress by the occupants of a room and can also be utilized for storing articles such as clothing and the like in a portion of the door and for passing articles through a portion of the door for service purposes. A door of this sort is shown in the copending application of Hollis L. De Vries for a "Service Door," Serial No. 250,391 filed January 9, 1963, now Patent No. 3,208,562 and assigned to the assignee of the present application.

An object of the invention is to provide a compartmented door having an appearance and a general operation much like a standard door.

Another object of the invention is to provide a compartmented door which can easily be operated even by those previously unfamiliar with devices of the sort.

A further object of the invention is to provide a compartmented door in which the possibility of jamming a compartment door in the door frame is precluded.

Another object of the invention is to provide a compartmented door in which there is an adequate interlock between the outside access and the inside access to the storage compartment, so that unauthorized ingress and egress cannot be accomplished.

A still further object of the invention is to provide a compartmented door which is attractive in appearance, quiet in operation and is in keeping with the high standards of modern building construction and equipment.

A still further object of the invention is to provide a compartmented door that can readily be fabricated and installed and which requires little or no maintenance or mechanical attention.

Another object of the invention is to provide a simply constructed yet secure compartmented door.

Other objects together with the foregoing are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawings, in which:

FIGURE 1 is an elevation of the compartmented door from the inside of a room with which it is utilized;

FIGURE 2 is a cross section to an enlarged scale, the horizontal plane of section being indicated by the line 2—2 of FIGURE 1, parts of the figure being broken away;

FIGURE 3 is a cross section, the horizontal plane of which is indicated by the line 3—3 of FIGURE 1, the scale being the same as that utilized in FIGURE 2 and the two figures being complementary;

FIGURE 4 is a cross section, the planes of which are indicated by the lines 4—4 of FIGURE 2, portions of the figure being broken away;

FIGURE 5 is a cross section, the plane of which is indicated by the line 5—5 of FIGURE 4, portions being broken away;

2

FIGURE 6 is a cross section, the plane of which is indicated by the line 6—6 of FIGURE 5;

FIGURE 7 is a cross section, the plane of which is indicated by the line 7—7 of FIGURE 4;

FIGURE 8 is a cross section, the plane of which is indicated by the line 8—8 of FIGURE 4;

FIGURE 9 is a cross section, the plane of which is indicated by the line 9—9 of FIGURE 4;

FIGURE 10 is a cross section, the planes of which are indicated by the lines 10—10 of FIGURE 2;

FIGURE 11 is a cross section, the plane of which is indicated by the line 11—11 of FIGURE 4;

FIGURE 12 is a cross section, the plane of which is indicated by the line 12—12 of FIGURE 4; and

FIGURE 13 is a cross section, the plane of which is indicated by the line 13—13 of FIGURE 10.

While there are many forms in which a compartmented door can be embodied for practical use, the one disclosed herein finds commercial utilization in a hotel installation. In this environment the door is disposed between a hallway 6 and a room 7 divided by a partition wall 8. Disposed in and forming part of the partition wall 8 is a door frame 9, conveniently fabricated of metal and outlining a door opening 10 defined by a pair of upright, parallel sides 11 and 12 and by a horizontal top 13, the opening extending to the floor 14.

Disposed to block the door opening 10 in one position and to leave the opening free in another position is a panel frame 16. This is shaped like the door opening and comprises a number of metal members including upright stiles 17 and 18 having parallel, upright outside edges substantially meeting with the outlines of the door frame 9 and also comprising horizontal top and bottom members 19 and 21 completing a rectangular enclosure surrounding and defining a central compartment 22. The structure generally is symmetrical about a central horizontal plane represented by the line 25, in FIGURE 1, so that the door can be used for right-hand or left-hand installation by rotation about a perpendicular, central axis.

Partly located in the compartment 22 and extending outwardly therefrom in both directions is a lock unit 23 preferably mounted in a central enlargement 24 of the stile 18 of the panel frame. The lock unit includes a latch bolt unit 26 interengaging with a strike 27 in the door frame 9.

Mounted on the panel frame adjacent the lock unit 23 is a pair of hawl-like disks 28 and 29 located respectively on the outside and the inside of the panel frame. Each of the disks is provided with a margin 31 having a sealing gasket 32 around its circular periphery. The disks do not extend outwardly as far as the knobs 33 of the lock unit, but do extend outwardly a substantial distance from the panel frame.

In order to supplement the volume of the central compartment 22 and to serve as an auxiliary exterior or outer compartment, there is provided an outer housing 36 preferably inclusive of a metal exterior panel 37, a metal interior panel 38 and intervening sound and fireproofing material 39. The outer housing 36 is generally quite flat or planar, is generally rectangular in elevation and covers substantially all of the panel frame, stopping slightly short of the marginal edges thereof. The outer housing

3,283,443

3

is sufficiently extensive to cover and extend beyond all of the compartment 22.

Adjacent one edge, the outer housing 36 is provided with a concealed hinge 41 secured to the hinge stile 17 of the panel frame, so that the outer housing can swing about the hinge axis 42 relative to the panel frame. The hinge is continuous and acts as a fire stop. Since the axis 42 of the hinge 41 is laterally and outwardly displaced from the axis 43 of the hinges 44 connecting the panel frame 16 to the door frame 9, the outer housing swings about a different axis and in a different arc than the panel frame. The swinging movement is between an outward, open position approximately at right angles to the plane of the panel frame and an inner position in which the edge of a circular opening cut in the outer housing panel 37 tightly abuts the gasket 32 to make a tight closure. A packing strip 45 follows the three remaining sides of the outer compartment and comes into close abutment with the panel frame to effectuate a tight closure in order to act as a fire stop, to avoid sound conduction and to prevent air flow.

So that the outer compartment can be secured in its closed position, it is provided with a key actuated lock 46. Preferably, the key for this lock is of a tubular form not usually encountered and is effective to operate in a specially formed annular opening 47 in the lock body 48. When operated by the key, the lock is effective to move a bolt 49 in an arcuate path between a horizontal locked position and a vertical unlocked position. Moving toward horizontal position, the bolt 49 swings into an inclined slot 51 in a strike plate 52 secured to the panel frame 16 by fastenings 53. Elongated slots 54 in the strike plate permit the movement of the inclined opening 51 up and down so as to vary the vertical and transverse point of engagement of the lock bolt 49. By adjusting the strike plate vertically, the amount of camming of the lock bolt 49 can be varied. More or less of a compressive force can thus be imposed upon the gasket 32 and the packing strip 45 to secure a tight closure.

The outer compartment, being centrally offset from the panel frame, affords an augmentation of the volume of the central compartment 22 when the outer housing and the panel frame are considered together as one unit. When the lock 46 is in its unlocked position, the outer housing 36 can swing away from the panel frame in order to afford access from the hall side to the central compartment.

If the outer housing 36 remains in the plane of the door frame 9 while the panel frame swings into the room about its hinge axis 43, the centers and radii are such that the free edge 56 of the outer housing can be moved laterally or transversely far enough to abut the door frame. The movable members act as a toggle and after initial abutment jamming may result. To preclude this undesirable occurrence, the outer housing is related to the panel frame not only by the hinge 41, but also by a pair of pivotally mounted toggle linkages 57 and 58 arranged symmetrically at the top and bottom of the structure and provided with springs 59. These can be closing springs so that the outer housing even though unlocked moves with the panel frame and so cannot jam against the door frame. Alternatively, these can be opening springs so that, when unlocked, the outer housing swings far away from the panel frame to the extent limited by the toggle linkages 57 and 58; for example, ninety degrees to the panel frame. Since the outer housing is thus not near the door frame, the difficulty or danger of jamming is thus precluded.

The central compartment is also augmented by an inner compartment having a housing 61 comprising an outer metal sheet 62, an inner metal sheet 63 and an intervening sound and fireproofing layer 64. The inner housing is centrally offset in order to provide a considerable enlargement of the compartment. The inner housing is mounted on a concealed hinge 66 extending along one

4

compartment edge parallel to the hinge axis 43. The hinge 66, being continuous, serves as a fire stop, also. The inner compartment has a depressed portion 67 to allow easy approach to the inner knob 33 and has a flange 68 defining a circular opening 69 in the outer sheet 62. The flange can be brought into close abutment with the gasket 32 around the disk 29. The inner compartment thus swings about its own hinge axis. This swinging motion is limited by toggle levers 70 and 71 symmetrically mounted at the top and bottom of the outer compartment and connected to the panel frame. Springs can be provided, if desired, as with the outer compartment but are usually omitted.

In order to secure the inner housing in its closed position against the panel frame, there is provided an appropriate latching mechanism. The panel frame 16 near its top and bottom and on its stile 18 is provided with a pair of adjustable stops 72 and 73 of generally conical contour. These are similar and each has a latching shoulder 74 thereon. Each stop is mounted by a threaded base 75 and is retained by a lock nut 76. The inner housing is provided with appropriate openings 77 to overlie the stops 72.

Disposed adjacent the openings 77 and designed to slide vertically on the inner housing between the outer edge and the lock unit 23 is a straight latch bar 78. The bar is a channel and is formed with key hole slots therein so that the latch bar can be slipped over the heads 81 of guide mounts 82 secured to the inner compartment by fastenings 83. Circumferential slots 74 in the guide mounts serve to guide and constrain the slide 78 to vertical motion. Adjacent each one of the latch stops 72, the slide carries one of a pair of stirrups 86. These are alike and each is urged downwardly by a coil spring 87 bearing on the stirrup at one end and bearing against a tab 88 at the other end. The tab is struck inwardly from the material of the slide 78.

To constrain the stirrup 86 and to serve as an anti-friction member, a roller 89 having journal ends 91 passing through the stirrup also is confined in slots 92 in the walls of the latch bar channel. The spring 87 urges the roller 89 toward the adjacent stop 72. When the inner housing is swung toward the panel frame, the roller 89 encounters the conical stop 72 and rides over the cone, compressing the spring 87 until the roller is behind the latching shoulder 74. Thereupon the spring expands to hold the roller in place and acts against the latch bar 78 which is urged downwardly by gravity. The inner housing is thus held in close juxtaposition to the panel frame. Since the conical stops 72 are adjustable, the inner housing can be brought closely adjacent the panel frame so that top and bottom gaskets 93 therearound are effective as seals.

In order that the latch bar 78 can be effectively operated to release the inner housing from the panel frame, the inner housing is provided with a slot 96 to accommodate an arm 97 joined by a fastener 95 to a block 100 connected to the latch bar between tabs thereon. The arm terminates in an exterior tubular handle 98. When the handle 98 is lifted, the latch bar is correspondingly lifted to free the rollers 89 from the latching shoulders, and the inner housing can be swung about its hinge axis to afford access to the interior.

Means are provided for affording an indication of the presence of stored articles within the interior compartment. For example, in a hotel installation, a valet or bellman opens the outer compartment and places garments within the enclosure for the use of the room occupant. The room occupant can then open the inner compartment and remove the garments. To afford an indication that the garments are available, a window aperture 101 is provided in the material of the inner housing. A slide 102 mounted on the latch bar 78 is movable thereon between two positions. In one position,

3,283,443

5

a red or other colored target 103 on the slide is brought into view behind the window 101. In another position of the slide 102 the target 103 is out of registry with the window 101. The slide 102 is formed with a number of spring fingers 106 bent around the sides of the channel-shaped latch bar. The slide is readily translatable along the bar by superior force but is held against casual dislodgement in either of its extreme positions by spring-urged frictional engagement.

Mounted on the panel frame is a swinging lever 108 movable on a pivot pin 109 and having a heavy handle portion 110 projecting a short distance for easy access. The lever is normally urged by gravity to lie against the upper end of a slot 115. When the latch bar 78 is raised toward its uppermost position, the slide 102 is raised therewith. Normally, the lever 108 is out of the way, but if not, the slide in rising forces a spring extension 111 on the slide to abut a nose 112 on the lever 108. Thereafter, the lever 108 rotates along with the raising of the slide and the latch bar so that the handle 110 swings lower. Finally, the rising slide lodges in an upper position. A spring finger 113 at the end of the spring extension 111 moves into a notch 114 cut in the inner compartment frame. Even though the latch bar is lowered thereafter, the slide 102 is retained in its uppermost position with the red target 103 lifted out of registry with and invisible through the window 101.

When the attendant places garments within the compartment from the hall side, he manually lifts the lever 110 from the lower position into the upper position. This motion causes a cam surface 116 at the end of the lever near the nose 112 to ride against the end of the finger 113 of the spring extension 111 and to move the finger end out of the notch 114. Further movement of the lever 110 then causes the nose 112 to move the slide 102 frictionally downwardly on the latch bar 78 until the red target 103 is in registry with and is visible through the opening 101. Subsequent raising of the latch bar by manipulation of the handle 98 when the inner housing is to be swung open to afford access to its contents then restores the slide 102 to its upper, notched and retained position. This removes the red target from the opening 101. In this fashion, there is afforded an indication of the presence of articles within the compartment.

There is also provided an interlock to make sure that the outer compartment cannot be opened even by use of a key unless the inner compartment is in its closed position. This is to prevent unwarranted access to the room 7 through the central compartment. The panel frame at a convenient point is provided with an extensible through rod 121. This is made up of a headed bolt 122 threaded in an internally threaded sleeve 123 and locked in a predetermined position by a threaded set screw 124. The head of the bolt 122 is urged to extend into the path of closure of the inner housing by means of a spring 126 centered on a boss 127 upstanding from an interlock body disposed against the outer housing.

The spring 126 bears against an intermediate latch lever 128. In turn, the latch lever rests against the tubular sleeve 123 of the through rod. The latch lever 128 at its upper end is pivoted to swing about a pin 129 passing through outstanding ears 131 on the interlock body and is contoured to afford a notch 132 limiting the motion of the latch by contact with a stop 133 pin. Adjacent the center of the latch lever 128 there is provided an outstanding foot 134.

In the retracted position of the latch, the foot 134 is entirely out of the rotational path of the latch bolt 49 and the latch bolt can be freely rotated and the outer compartment locked and unlocked. However, when the inner compartment is open or has started to open, the spring 126 displaces the through rod 121 and also permits the latch 128 to swing under spring force and posi-

6

tion the foot 134 in the path of rotation of the latch bolt 49. Thus despite the insertion of a key in the lock opening 47, the latch bolt 49 cannot be rotated and the outer compartment cannot be opened with respect to the panel frame. The outer compartment can only be unlocked when the inner compartment is in its closed position and the spring 126 has been again compressed and the latch lever 128 swung into a position so that the foot 134 is out of the path of the latch bolt 49.

The outer compartment can be easily opened by use of the proper key when the inner compartment is closed, but the inner compartment cannot ever be opened from the outside. The latch bar 78 and the handle mechanism are entirely separated from or isolated from the compartment 22 by an angle harrier 136. This serves also as a fire stop as it extends for nearly the full height of the stile 18, being augmented by appropriate packing strips at the top and bottom. The latch bar can only be operated by manipulation of the handle bar 98 when the inner compartment is closed. While the central compartment 22 may remain simply as an enclosure, it is preferably provided with various appropriate service fittings; for example, a shelf and hanger bracket 141 at the top and a ventilated receptacle 142 at the bottom.

What is claimed is:

1. A compartmented door for use in a door frame comprising a panel frame having a compartment opening therein and having a pair of upright edges, means for hinging said panel frame to said door frame adjacent one of said edges, an inner housing overlying said compartment opening and extending substantially to the other one of said edges, means for hinging said inner housing to said panel frame adjacent said one edge, a pair of locking lugs on said panel frame adjacent the top and bottom thereof, an upright locking bar on said inner housing adjacent said other edge vertically movable into and out of locking engagement with said lugs, and means extending between said panel frame and said inner housing in closed position thereof for isolating said locking bar from said compartment opening.

2. A compartmented door as in claim 1 in which said isolating means is a wall outstanding from said panel frame.

3. A compartmented door for use in a door frame comprising a panel frame having a compartment opening therein and having a pair of upright edges, means for hinging said panel frame to said door frame adjacent one of said edges, a lock unit on said panel frame adjacent the other of said edges, said lock unit projecting from opposite sides of said panel frame, an outer housing overlying said compartment opening and extending substantially to the other one of said edges, said outer housing having an aperture therein surrounding a projecting portion of said lock unit, means for hinging said outer housing to said panel frame adjacent said one edge, an inner housing overlying said compartment opening and extending substantially to the other one of said edges, said inner housing having an aperture therein surrounding a projecting portion of said lock unit, means for hinging said inner housing to said panel frame adjacent said one edge, a pair of locking lugs on said panel frame adjacent the top and bottom thereof, an upright locking bar on said inner housing between said aperture and said other edge vertically movable into and out of locking engagement with said lugs, a barrier on said panel frame between said compartment opening and said locking bar for rendering said locking bar inaccessible from said compartment opening, a lock on said outer housing movable between a first position engaging said outer housing with said panel frame and a second position releasing said outer housing from said panel frame, and means effective when said locking bar has been moved out of locking engagement with said lugs and said inner hous-

3,28- 143

7

ing is moved away from said panel frame to hold said outer lock in said first position.

4. A compartmented door as in claim 3 in which said means to hold said outer lock in said first position includes a through rod in the path of closure of said inner housing, and means for mounting said through rod to yield resiliently to closing movement of said inner housing.

5. A compartmented door as in claim 4 in which said mounting means positions said through rod to yield only upon the final closing movement of said inner housing from said panel frame.

8

References Cited by the Examiner

UNITED STATES PATENTS

215,439	5/1879	Crane	20—16 X
1,222,963	4/1917	Matchette	20—16, 1
1,686,831	10/1928	Matchette	20—16, 4
2,033,806	3/1936	Baker et al.	
2,197,103	4/1940	Gray	
2,518,041	8/1950	Hiler	

HARRISON R. MOSLEY, *Primary Examiner*.

KENNETH DOWNING, *Examiner*.



FIG. 2. -- Inside door of SCHLAGE Valet-Door opened up to show interior.

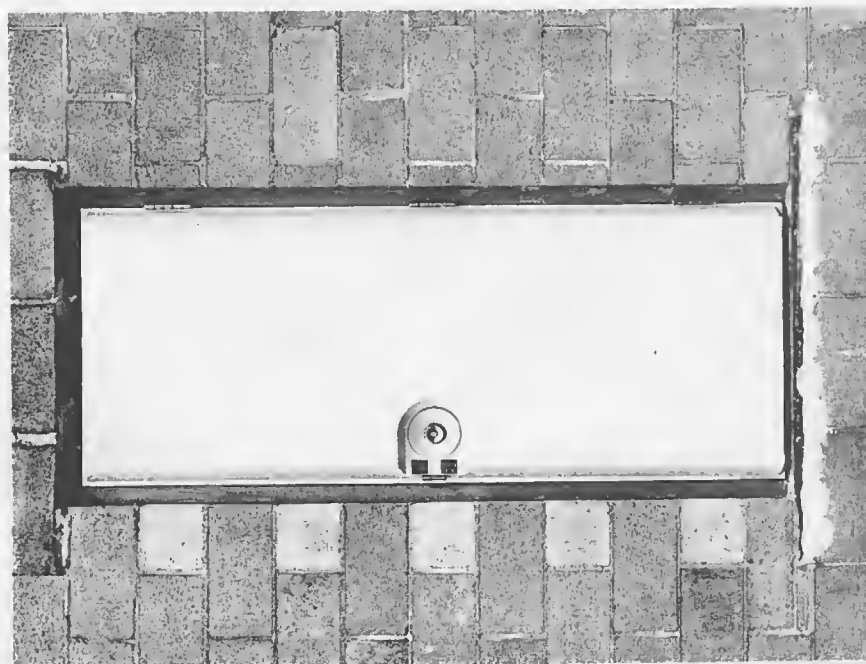


FIG. 1. -- Exposed (room) side of SCHLAGE Valet-Door before test.



FIG. 7 -- SCHLAGE Valet-Door after 1 1/2-hour fire test and standard hose-stream test.
The door remained in place and the hose stream did not break through.

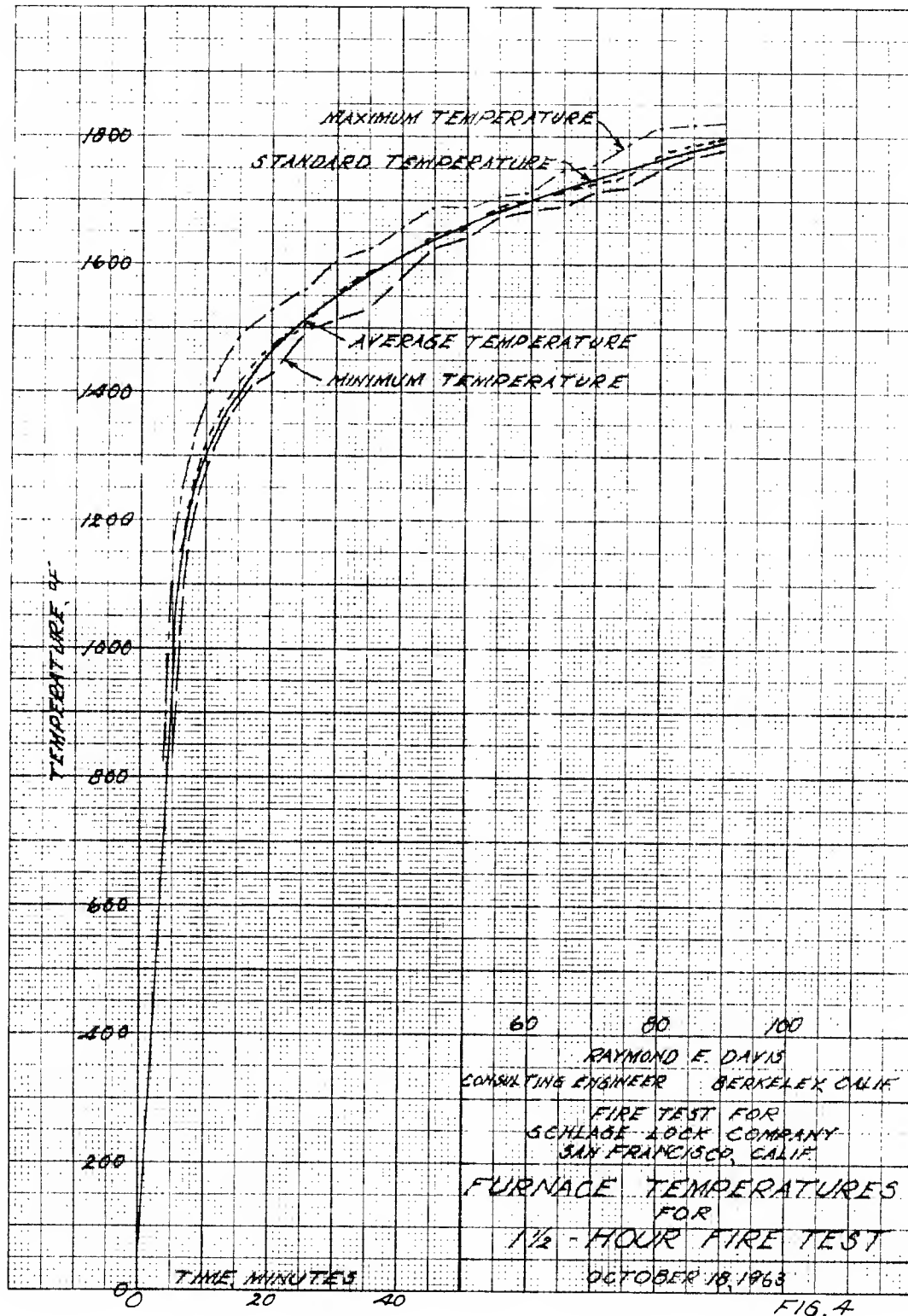


Exhibit B-6a Furnace Temperature of Fire Test

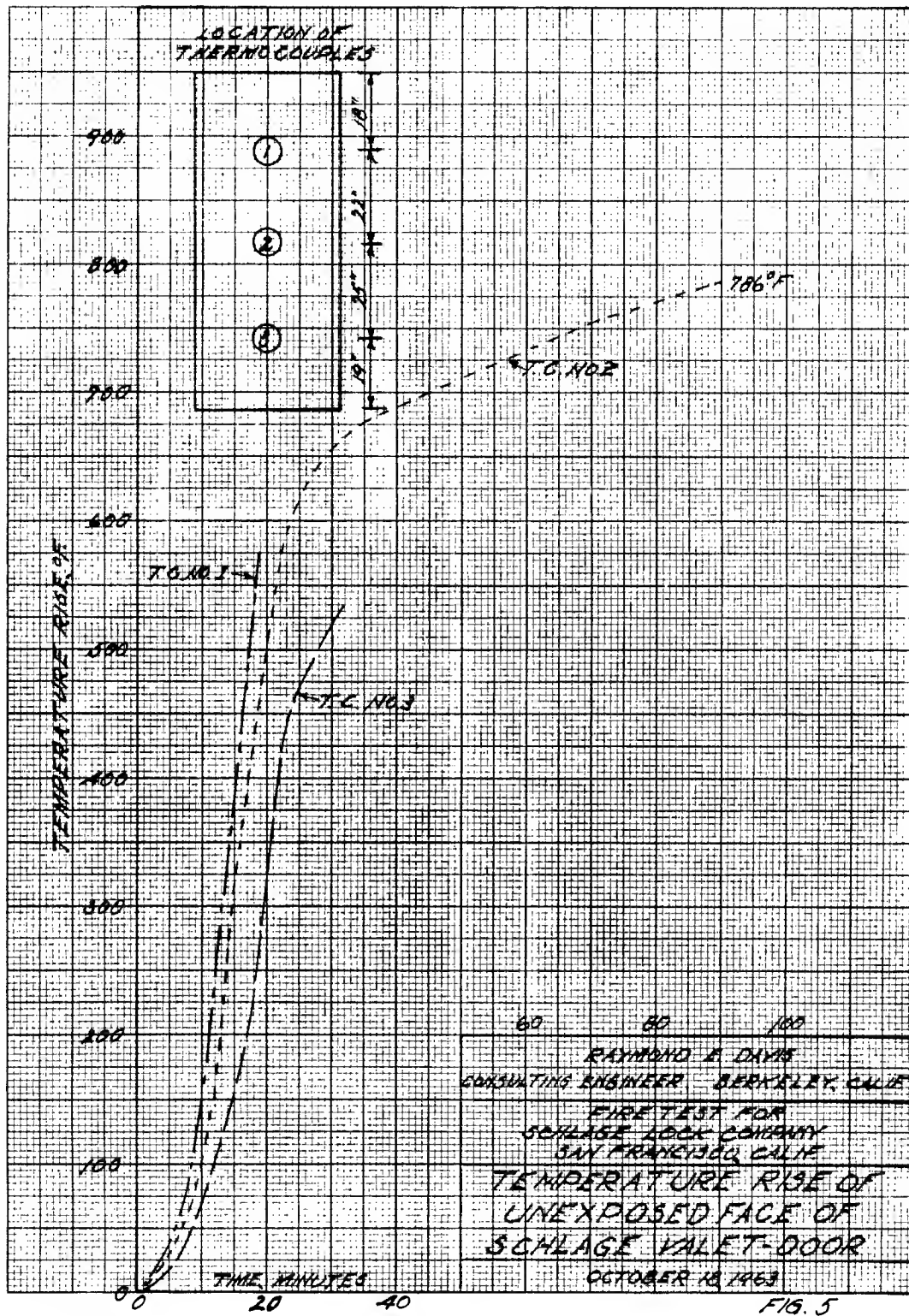


Exhibit B-6b Temperature Rise of Unexposed Side of Valet Door During Fire Test

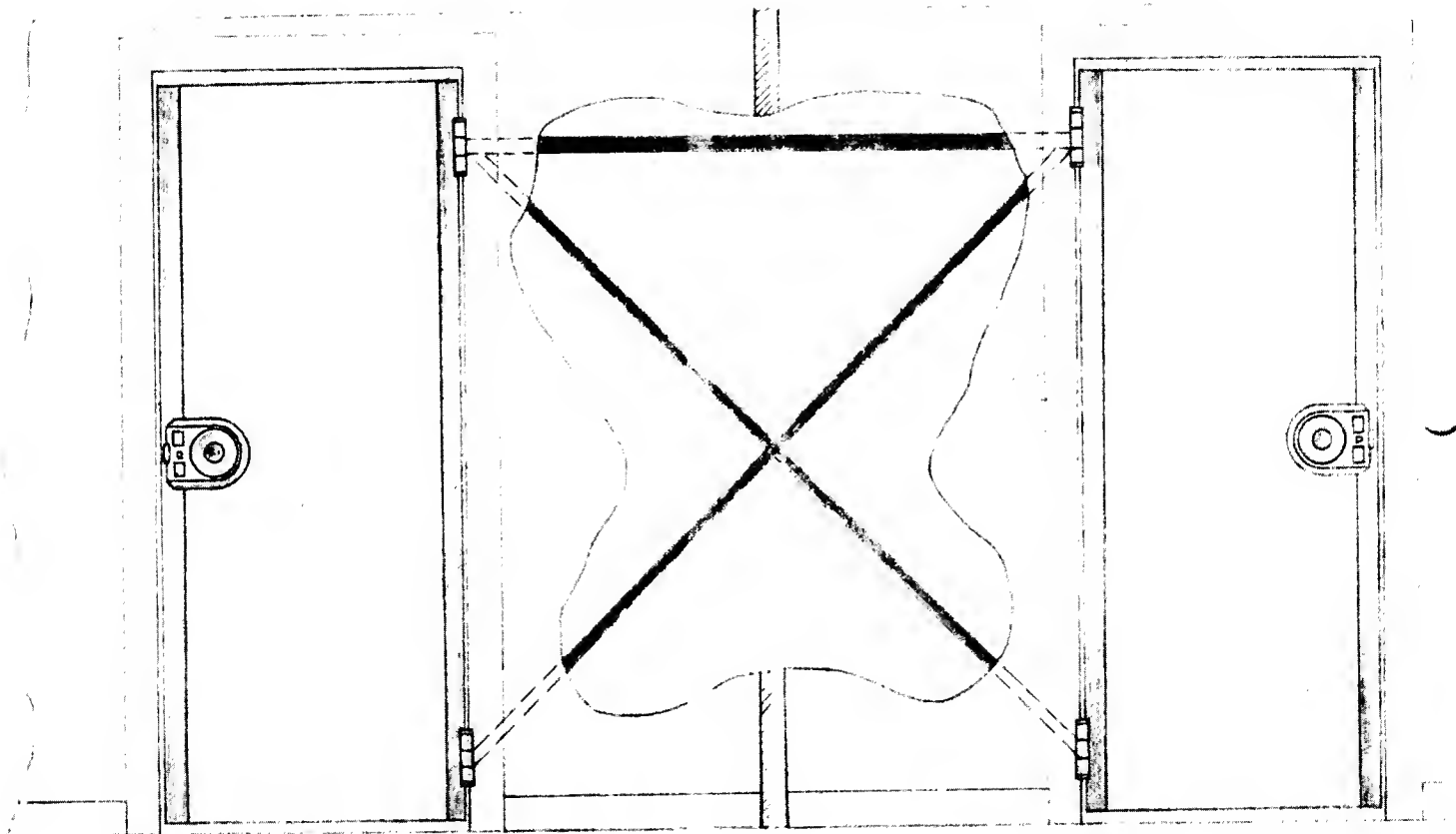


Exhibit B-7 San Francisco Hilton Wall Bracing Scheme for Use on "Valet Door" Floors